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JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

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THE SEVENTY-FIRST ANNUAL CONVENTION OF THE AMERICAN PHARMACEUTICAL ASSOCIATION WILL BE HELD IN ASHEVILLE, N. C., DURING THE WEEK OF SEPTEMBER 3, 1923.

The 1923 meetings of the American Conference of Pharmaceutical Faculties and the National Association of Boards of Pharmacy will also be held in Asheville during the week of September 3.

For Association Roster see pages x, xii, xiv, and xv.

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JOHN MORGAN

1735–1789

Second Apothecary of Pennsylvania Hospital
Director-General and Physician-in-Chief of the General Hospital of the American Army, 1775–1777

John Morgan

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL. XII JUNE, 1923 No. 6

JOHN MORGAN.

The name of Dr. John Morgan is closely associated with pharmacy not only because he served as an apothecary in the Pennsylvania Hospital for a time, but indelibly so because he was preëminently instrumental in bringing about a separation of pharmacy from medicine, in the United States. He was the son of Evan Morgan, a merchant of Welsh descent who had been a friend and neighbor of Benjamin Franklin, and had also been associated with him as a member of the Board of Trustees of the Pennsylvania Hospital.

John Morgan served an apprenticeship with Dr. John Redman, and succeeded as the second apothecary at the aforementioned hospital, May 19, 1755, serving about one year. Thereafter, he concluded his studies at the College of Philadelphia, which later became part of the University of Pennsylvania. He served as surgeon and lieutenant in the French and Indian War; in 1760 he went to Europe to broaden his professional equipment and received the degree of M.D., in Edinburgh, 3 years later. While studying anatomy during the following year, in France, he submitted a treatise which procured his admission into the Royal Academy of Surgery.

It was probably while in France that he was impressed with the need of separation of the practice of pharmacy from medicine. Prior to returning to the United States in a letter to a friend he stated:

> "I am now preparing for America to see whether after fourteen years' devotion to medicine I can get my living without turning apothecary or practitioner of surgery."

Soon after his return to the United States he delivered a series of lectures relating to "The Medical Schools in America," May 30–31, 1765, wherein he said:

> "We must regret that the very different employment of physician, surgeon and apothecary should be promiscuously followed by any one. They certainly require very different talents.
>
> "The business of pharmacy is essentially different from either, free from the cares of both. The apothecary is to prepare and compound medicines as the physician shall direct. Altogether engaged in this, by length of time he adds to that skill therein which he could never have arrived at were his attention distracted by great variety of other subjects.

"The wisdom of ages, approved by experience the most certain test of knowledge, has taught us the necessity and utility of appointing different persons for these different employments, and accordingly we find them prosecuted separately in every wise and polished country."

The name of John Fothergill, eminent London physician and member of the Society of Friends, is linked with the early history of this country in many ways, not alone through his commendable political and moral suasion, but as far as botany is concerned through friendly business and professional relations with John Bartram; doubtless, the strong friendship existing between him and Benjamin Franklin had an influence in shaping medicine and pharmacy, both in Great Britain and the United States.

There being scarcity of qualified pharmacists in this country the directors of the Pennsylvania Hospital conferred with Dr. John Fothergill, who at various times recommended pharmacists who had qualified in their work as apothecaries in England, for the Pennsylvania Hospital. It was at this hospital soon after its dedication that an apothecary was employed, and also a pharmaceutical laboratory was established which served in a very helpful way in preparing medicines for the Continental Army. During these years apothecaries were apprenticed and the periods of their apprenticeships were limited accordingly until the election, in 1831, of Dr. John Conrad who served faithfully until 1870. When he resigned, a permanent home was given him in the hospital with every acceptable privilege. The following few lines are taken from an extended record in the minutes of the hospital:

"From 1831 until 1870, Dr. Conrad was the apothecary of this house in the department of the sick. The list of Resident Physicians during that time includes 70 names;* * * is there one among them who ever forgot John Conrad?* * * *"

About 1769, as an adjunct to the "elaboratory" a botanical garden—for the study, observation and resource—became part of the institution.

The recommendation for the former and the employment of a botanical gardner was signed by John Morgan. In August 1775 Congress appointed the latter Director-General and Physician-in-Chief of the General Hospital of the American Army. His insistence that those in the medical service be qualified to treat the sick and wounded intelligently led to the removal of influential incompetents and, indirectly, by the duplicity of those affected to his own dismissal on unjust charges. However, an investigating committee afterward honorably acquitted him, and Washington himself bore testimony to his rectitude and professional capacity.

He impressed American pharmacy and medicine by his firm conviction that the same individual should not engage in both the application and preparation of medicine. He conscientiously practiced what he advocated and did not dispense medicine after earning his degree as doctor of medicine, even though prior experience as apothecary may have qualified him in pharmacy; he gave not only educational reasons for his stand but also pointed out the dangers and difficulties that obtained in attempting both. Dr. John Morgan died October 15, 1789, aged fifty-three years.

E. G. E.

EDITORIAL

E. G. EBERLE, EDITOR 253 Bourse Bldg., PHILADELPHIA

HOSPITAL PHARMACY.

THE two papers* read before a recent meeting of the Chicago Branch of the American Pharmaceutical Association relating to hospital pharmacy, namely, "The Field of Hospital Pharmacy," by Homer F. Sanger of the Council on Medical Education and Hospitals of the American Medical Association, and "The Relation of the Hospital Pharmacist to the Medical and Administrative Corps," by Egil T. Olsen, superintendent of the Englewood Hospital, Chicago, bring to mind the notable advance of hospital pharmacy within the last decade.

According to a statement by Mr. Sanger, there are 136 hospitals in Chicago and 6580 hospitals in the United States proper, while, according to a recently compiled list, there are 49 hospital pharmacists in Chicago. In the same ratio there would be approximately 2400 hospital pharmacists in the United States. The advance of hospital pharmacy is along three lines: an increase in the number of hospital pharmacies, an improvement in the scientific attainments of hospital pharmacists, and a marked tendency to recognize hospital pharmacists as more nearly on a parity with the medical men.

In our libraries are hospital pharmacopœias and formularies dating back a century or more, but upon investigation we find that these compilations were the work of physicians rather than pharmacists. The medical men who served as compounders and dispensers in these hospitals a century ago were gradually displaced by orderlies, acting directly under their supervision, but who later developed into pharmacists of a sort. We still have in some hospitals, and, especially in dispensaries, vestiges of this system wherein practically untrained men prepare simple medicines or compounds in quantities and then dispense them, frequently under designation of a number or symbol.

The modern hospital pharmacist is the product of the last few decades. He buys, manufactures and stocks as complete and extensive a line of medicinal substances as can be found anywhere, for the medical staff constantly demands the use of the newest things in medicine. The pharmacist prepares and constantly replenishes the medicine cabinets available to the nurses in each ward or on each floor of the hospital. He makes, with few exceptions, his own U. S. Pharmacopœial and National Formulary preparations and compounds and dispenses medicines on physicians' and surgeons' orders. He prepares medicinal solutions for intraspinal, intravenous, intramuscular, intraperitoneal and subcutaneous injection. He is called upon to prepare and supply diagnostic reagents, solutions for pyelography, solutions for the preservation of pathological specimens, chemical reagents and stains; also, antiseptic and disinfectant solutions. In addition he frequently teaches practical pharmacy and dispensing to the student nurses.

The quotation from Mr. Sanger—"If there is at present a striking increase in the amount of hospital service, there is just as striking a demand for better hos-

* Printed in this issue of the JOURNAL.

pital service," leads to the inquiry—is hospital pharmacy keeping pace in service and standardization with the other departments of the hospital? Standardization for this department is sure to come. Shall it be standardized from within, that is, by the hospital pharmacists themselves, or by some outside agent? Would it not be well for the Section on Hospital Pharmacy of the American Pharmaceutical Association to devote itself to a nation-wide canvass and statistical tabulation of hospital pharmacies and to an endeavor to bring about a standardization of hospital pharmacy?

WILLIAM GRAY.
E. N. GATHERCOAL.

PHARMACISTS IN THE OFFICERS' RESERVE CORPS, U. S. ARMY.*

Pharmacists are eligible, under existing laws and regulations, for appointment as officers in the Medical Administrative Officers' Reserve Corps, provided they have the necessary qualifications. Representative pharmacists are needed in the scheme of national defense, and the success of the plans for such defense will be measured largely by the success of the Reserve forces of the Army. The World War found the nation with a small Regular Army and, with the exception of the National Guard troops, there was practically no Reserve. Consequently it became necessary for the Medical Department to commission upwards of forty thousand officers whose qualifications could not be accurately appraised, and naturally their assignments to specific duties were not based upon appropriate fitness. The object of the Reserve Corps is to create a force of officers whose qualifications will be known and who, being already commissioned, will be ready for duty in advance of an emergency, thus avoiding the mistakes that attend an organizing effort carried on in the hurry and stress of war.

The hospitalization plans call for a certain number of pharmacists who may be appointed 2nd lieutenants in the Medical Administrative Corps. Promotion to the grade of 1st Lieutenant and captain will be dependent upon age, length of service, and military training. Those who held commissions in the World War are eligible for appointment in the same grade without examination, or they may elect to take an examination for appointment in a higher grade. Training has so far been voluntary, and in all probability the War Department for some years to come will be able to train only those who volunteer for active duty during the training season.

Applications for appointment should be addressed to the Commanding Officer of the Corps Area in which the applicants reside. From this officer blank forms for application and for the physical examination may be obtained. The application should be accompanied by three letters of recommendation, one of which should be from the Dean of the College of Pharmacy or of the Department of Pharmacy of the University of which the applicant is a graduate.

The opportunity afforded by enlistment in the Officers' Reserve Corps has great significance—it is an opportunity for service for Country and for Pharmacy—in the selection of qualified pharmacists pharmacy receives a desired recognition, and pharmacists are placed in positions whereby they may benefit and promote

* See pp. 54, 717, 763–766, volume XI, 1923, JOURNAL A. PH. A. We are also indebted to the Surgeon General and Lt. Col. C. R. Reynolds for assistance in preparing this comment.

pharmacy. The unsatisfactory situation at the time when the United States entered the War has not been forgotten, and now the value of pharmacy in military service may be further demonstrated.

The American Pharmaceutical Association has always exhibited a deep interest in the status of pharmacists in the Government service; the American Conference of Pharmaceutical Faculties shares in a duty to perform with the National Association of Boards of Pharmacy in directing qualified pharmacists to a service and, perhaps, preparing them for it, whereby several of the departments of the Government are brought into closer relation with pharmacy. A vision may be pardoned—although this comment is specifically for the purpose of enlisting cooperative interest in the Officers' Reserve Corps—which reveals more pharmacists engaged in the service of other departments wherein the knowledge of pharmacy is of great value. E. G. E.

NEWSPAPER ETHICS AND AMERICAN PHARMACY.

The American Society of Newspaper Editors convened in Washington during the last week of April. A preliminary meeting for organizing the Society was held in Chicago early in 1922, when a temporary organization was effected and the foundation laid by the present structure. Another meeting was held prior to the one in Washington. The purpose of this comment, however, is not to give an historical account, but, without presumption, to commend the Society's aims and purposes.

Every trade and profession is to some extent misjudged because of imperfections; ethical standards which they adopt are guides for conduct of those engaged therein. The drug business and pharmacy have suffered because their codes of ethics are not fully comprehended, nor can a large group claim absolute strict adherence to standards, for the individual is not without fault. The development and service of pharmacy are promoted not only by the determination of its votaries to keep the ideals of the profession before them, but also by the confidence of and the encouragement given by those served; such relation obtains in all lines just as with the individual—approval rightly bestowed is always an incentive to advance; approval of wrong-doing or indifference, undermines or honeycombs codes of ethics.

There is much in the transactions of the Society that brings to mind the discussions of pharmacists and, therefore, liberty is taken by quoting various points that exhibit related problems and aims. President Caspar S. Yost in outlining some of the purposes of the Society said—"it is to defend the properly conducted press against unjust and untruthful attacks and counteract the influence of unjustifiable antagonism—

> "First, by collective expression in some form to show the untruth that lies in them, where they are in fact untruthful; and, second, by collective action to establish definite standards of journalistic conduct which will serve to lessen occasion for truthful criticism."

It is unnecessary to comment on the application of what President Yost said to pharmacy. Our Committee on Publicity has accomplished much and in some cities coöperation with newspapers has produced good results. The adoption of the revised code of ethics and the splendid publicity given thereto by the pharmaceutical press and, to some extent, by other publications has been influential for good.

Taking into consideration the transactions and the men who participated in the convention, sincerity of honest purposes was evident strengthened by faith and hope. The definition of the "modern newspaper," its duties, obligations and responsibilities is set forth in the prelude to the "Canons of Journalism" adopted as basic principles of the profession:

"The primary function of newspapers is to communicate to the human race what its members do, feel and think. Journalism, therefore, demands of its practitioners the widest range of intelligence, of knowledge and of experience; as well as natural and trained powers of observation and reasoning. To its opportunities as a chronicler are indissolubly linked its obligation as teacher and interpreter."

The following declaration of principles was adopted without a dissenting vote:

"A newspaper cannot escape conviction of insincerity if, while professing high moral purpose, it supplies incentives to base conduct, such as are to be found in details of crime and vice, publication of which is not demonstrably for the general good. Lacking authority to enforce its canons, the journalism here represented can but express the hope that deliberate pandering to vicious instincts will encounter effective public disapproval or yield to the influence of a preponderant professional condemnation."

In framing the code of ethics the American Society of Newspaper Editors has grouped "Sincerity, Truthfulness and Accuracy," fundamentals of our own code; the best and better practices of newspaperdom have been drawn upon for the guidance of its members; the time-honored, modern and better practices of pharmacy served in constructing the revised code of ethics of the American Pharmaceutical Association. The hope is restated and wishes extended that the efforts of the Society may be eminently successful; it is more or less concerned with all activities, but speaking for pharmacy—the realization is growing with its hopes and aspirations, in faith, that a better understanding of its aims will aid in promoting the greater work of the American Pharmaceutical Association, and make possible greater and better pharmaceutical service.

"Faith is the backbone of the social and the foundation of the commercial fabric; remove faith between man and man, and society and commerce fall to pieces." E. G. E.

THE EFFICIENCY OF HYDRATED OXIDE OF IRON AS AN ANTIDOTE FOR ARSENIC.

To the Editor, Journal A. Ph. A.:

It is perhaps unusual to criticize the conclusions of a scientific investigator without adducing new evidence. The matter, however, is of so great practical importance that I feel justified in questioning the interpretation of the experimental results in the paper of Drs. McGuigan, Atkinson and Brough on the antidotal efficacy of ferric hydroxide in arsenic poisoning, in the April number of the JOURNAL.

The conclusion of the authors that this traditional antidote is of no practical value in the treatment of arsenical poisoning seems to me not only unproved but in direct contradiction to their published experiments.

In the first place, the basis of the claim for antidotal action of the iron salt is that it forms a relatively insoluble compound of arsenic that will be less rapidly absorbed; not that there is a complete destruction of the toxicity of the arsenic. To gauge the efficacy by simply following a superfatal dose of arsenic by the antidote

with no provision for the removal of the precipitated compound is not a fair criterion of the value of the antidote in clinical conditions. In arsenical poisoning vomiting is an almost constant symptom and if it had not occurred the antidote would certainly be associated with emetics and laxatives.

The neglect of this factor offers an explanation of the difference in the results obtained by the present authors and those by Dr. Watt many years ago. Watt (*Ohio Med. and Surg. Journal*, 1861, 287) administered to dogs arsenous acid *in solution* in doses ranging from $^1/_6$ to $^2/_5$ grain per pound (equivalent to from 0.023 to 0.057 Gm. per kilo). Four animals received no antidote, all of whom died within less than 8 hours, while out of fourteen animals that received the antidote there was only one death and that in a dog which had received $^2/_5$ grain per pound. While a theoretical objection may be raised to his experiments on the ground that he does not definitely state that the animals were observed for two weeks after apparent recovery to detect a possibility of late evil results, the facts that in the untreated dogs there was progressive aggravation of the symptoms until death, and that in the dogs that received the antidote there was an almost immediate abatement with complete disappearance of all symptoms within a few hours, seem to demonstrate that the antidote had a beneficial effect, even if we do not concede that its use reduced a 100 per cent. mortality to 7 per cent.

It is also worthy of note that in the experiments reported by Drs. McGuigan, Atkinson and Brough, even in their fatal cases there was an evident prolongation of life. Moreover, in their dogs poisoned with Fowler's Solution: without the antidote the mortality was 100 per cent., but of those that received the antidote 20 per cent. lived the arbitrary period of two weeks which the authors have accepted in the body of the paper as evidence of survival. In the dogs poisoned with solid arsenous oxide the mortality without the antidote was 81.5 and with the antidote 65.4 per cent.

The authors state that the volume of the antidote makes no difference in the result and yet in their published tables with solid arsenic, of the fatal cases among those dogs that received 100 cc death occurred on the average within 24 hours, while in those cases in which 200 cc or more were given the average duration of life in fatal cases was 167.8 hours. (In their summary of this table they give average duration of life as 95.7* but there is either a misprint inthe published tables or a miscalculation in this average.)

The authors of the paper do not appear to have made any study of the literature of this subject, the only authority quoted being Busscher. Although there has been very little study of the subject for the past several decades the universal approbation of this antidote by practically all toxicologists was not based on mere tradition. In the middle of the last century there was a great dispute concerning the relative value of magnesia and iron in arsenic poison which led to a considerable experimental and clinical study of the value of these antidotes.

For these reasons I do not think that the time has come for us to abandon this time-tried antidote. Even if it will not cure every case of arsenic poisoning without any other remedial measures, the evidence is very strong that it is of real value.

HORATIO C. WOOD, M.D.

MAY 14, 1923.

* Authors' Correction—Last line of Table XII, *Recapitulation of Data*, Table XI, April JOURNAL, p. 331, should be (55.0), 107.7 and 95.8, instead of (55.0, correct), 95.7, 74.0.

STUDIES OF THE BARK OF MYRICA CERIFERA, LINNÉ.*

BY HEBER W. YOUNGKEN.

During the years 1912 to 1915 the author of this paper carried on an investigation of the structure, classification and distribution of the species of the *Myricaceæ* that are indigenous to the Eastern United States. The results of this work have been published in "Contributions from the Botanical Laboratory of the University of Pennsylvania."[1] In this report, while the microscopical as well as the gross anatomical features of the various organs of several *Myrica* species including *M. cerifera* were among the points discussed, no attempt was made to emphasize the bark of *M. cerifera* any more than any other region of this or the other species considered, the dissertation being of pure botanical character and intent. Since that time a goodly number of samples labeled "Bayberry Bark" have come under his observation. The majority of those examined up until about a year ago represented varying proportions of root and rhizome bark or root, rhizome and aerial stem bark, while one sample consisted entirely of aerial stem bark. Three samples of bark examined the last year and coming from different commercial houses were found to consist entirely of root bark and root of *Myrica cerifera*. Thus from a pure botanical problem interest began to develop in a pharmacognic one.

In the National Formulary IV, Myrica Bark is listed under the title of Myrica[2] with the synonym of "Bayberry Bark."

It is here defined as follows: "The dried bark of the root of *Myrica cerifera* Linné (Fam. *Myricaceæ*) without the presence of more than 5 per cent. of adhering wood." It appears to be official mainly on account of its being employed as one of the ingredients of Pulvis Myricæ Compositus (Compound Powder of Bayberry), N. F.

On account of his familiarity with the general content of specimens of this bark coming from the states bordering the South Atlantic seaboard, the writer began to wonder why the rhizome and aerial stem bark were not recognized along with the root bark, especially since the roots of so many of these plants which he had previously investigated were so thin and yielded comparatively little bark as compared with the longer and thicker rhizomes and aerial stems. It was this thought which led to the more minute study of the bark portion of the plant from a pharmacognic standpoint. Samples of root, aerial stem and rhizome barks of *Myrica cerifera* were collected by the writer from plants growing in a brackish swamp near Petersburg, N. J. These were later studied from the physical, microscopical and qualitative chemical viewpoints, the materials used being in part fresh, dried and powdered. The standard specimens were later compared with several samples of the article of commerce and previous conclusions verified.

Seeing that a number of physical characteristics are common to root, aerial stem and rhizome barks of a wide range of authentic specimens, these will be first described collectively.

PHYSICAL CHARACTERISTICS OF MYRICA CERIFERA BARK.

In transversely curved pieces, strips or quills of varying length and breadth and usually 2.5 mm. or less in thickness, rarely up to 5 mm. thick (aerial stem

* Scientific Section, A. Ph. A., Cleveland meeting, 1922.

bark); outer surface varying from silvery gray to grayish brown or reddish brown, scaly in rhizome and root barks, bearing occasional warts or slight transverse ridges, that of the aerial stem bark exhibiting a number of raised oval lenticels; inner surface reddish brown to brown, finely longitudinally striated, somewhat roughened (rhizome and root barks); fracture short, weak and uneven, the fractured surface reddish brown with short projecting fibers near and along inner margin of root bark; odor characteristic; taste astringent, mildly bitter and slightly acrid.

HISTOLOGY OF ROOT BARK OF MYRICA CERIFERA.

Sections of the root bark (Fig. 1), when examined microscopically, exhibit an outer cork of several layers of suberous cells many of which possess lignified

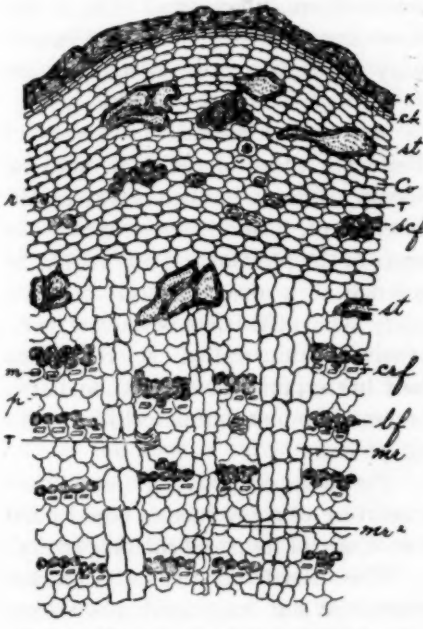

Fig. 1.—Transverse section of root bark of *Myrica cerifera* L.—showing cork (*K*); cork cambium (*ck*); cortex (*Co*); tannin cells (*T*); stone cells (*st*); sclerenchyma fibers (*scf*); rosette crystals of calcium oxalate (*r*); monoclinic prisms of calcium oxalate (*m*); phloem (*p*); bast fibers (*bf*); primary medullary-ray (*mr*); secondary medullary ray (mr^2); and crystal fibers (*crf*). × 75.

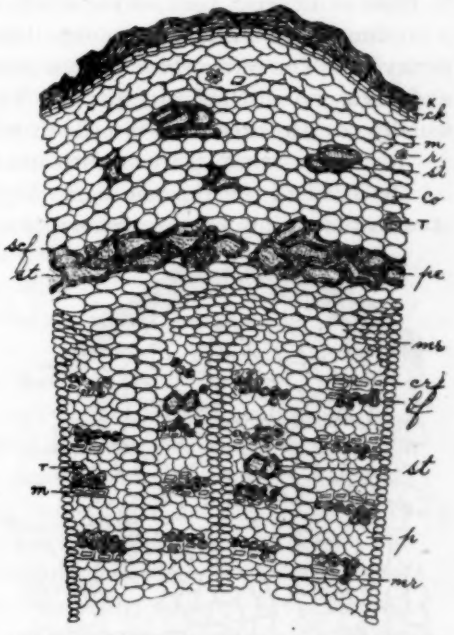

Fig. 2.—Transverse section of aerial stem bark of *Myrica cerifera* L.—showing cork (*K*); cork cambium (*ck*); cortex (*Co*); pericycle (*pe*), containing a nearly continuous band of sclerenchyma fibers (*scf*), and stone cells (*st*), the latter predominating; phloem (*p*); bast fibers (*bf*); crystal fibers (*crf*); tannin cells (*T*); medullary rays (*mr*); rosette crystals (*r*); and monoclinic prisms of calcium oxalate (*m*). × 75.

walls, a phellogen of meristematic cells, a secondary cortex of cortical parenchyma, some of the cells of which contain tannin, others starch, others rosette crystals or monoclinic prisms of calcium oxalate, while some are more or less filled with a yellowish brown substance termed by Tison and Chevalier[4] "lignine gommeuse," a broad phloem separated into a number of phloem patches by starch-containing medullary-rays which frequently broaden out toward the cortex. The primary medullary-rays are mostly 1 to 4 cells, rarely 1 to 5 cells broad. The secondary medullary-rays are 1 to 2 cells broad. Scattered among the cells of both phloem and cortex will

be noted numerous sclerenchyma fibers and stone cells arranged both singly and in groups. The former are often accompanied by crystal fibers containing monoclinic prisms of calcium oxalate. The stone cells are of variable shape, have lamellated, porous walls and vary in length from 24 microns to 129 microns and in breadth from 15 to 59 microns. The monoclinic prisms vary in length from 7 to 22 microns, while the rosette aggregates are from 11 to 35 microns in diameter. The starch grains are single or 2–4 compound, the individual grains spheroidal or plano-convex and up to 12 microns in diameter.

HISTOLOGY OF AERIAL STEM BARK OF MYRICA CERIFERA.

Sections of the aerial stem bark (Fig. 2) have a somewhat similar appearance to those of the root bark, being chiefly distinguished from the latter by possessing a continuous or nearly continuous band of sclerenchyma fibers and cells in the pericycle. The outer three or four layers of exocortex tend to be collenchymatic and show no distinct air spaces. The primary medullary-rays, moreover, are usually one to three rows of cells in width.

HISTOLOGY OF RHIZOME BARK OF MYRICA CERIFERA.

Sections of the rhizome bark (Fig. 3) differ from those of the root or aerial stem barks mainly by the absence of sclerenchyma elements in the cortex, by the presence of fewer sclerenchyma elements in the phloem and further by the presence of a discontinuous zone of widely separated islets of narrow, comparatively thin-walled sclerenchyma fibers in the pericycle. All three barks possess abundant tannin cells in cortex and phloem.

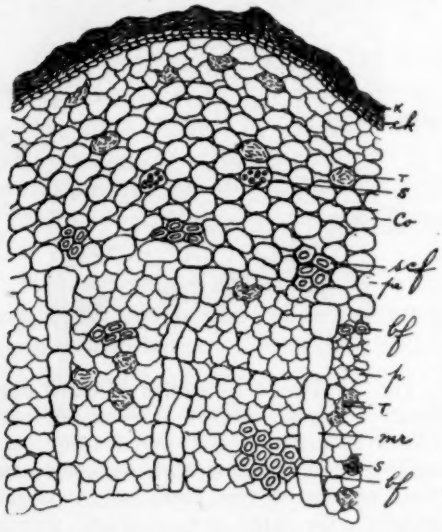

Fig. 3.—Transverse section of rhizome bark of *Myrica cerifera* L.—showing cork (*K*); cork cambium (*ck*); cortex (*Co*); pericycle (*pe*), containing islets of sclerenchyma fibers (*scf*); phloem (*p*), separated into phloem patches by medullary-rays (*mr*); bast fibers (*bf*) in phloem patches; starch (*s*), and tannin (*T*). × 75.

Powdered Myrica cerifera Bark (consisting of a mixture of equal parts of root, aerial stem and rhizome barks).

The powdered drug is reddish brown. When examined microscopically it exhibits numerous simple or two- to three- or rarely four-compound starch grains, the individual grains being spheroidal or plano-convex, often with a central cleft and up to 12 microns in diameter; calcium oxalate crystals chiefly in monoclinic prisms from 7 to 22 microns in length, some in the form of rosette aggregates from 11 to 35 microns in diameter; numerous strongly lignified sclerenchyma fibers with walls up to about 13 microns in thickness; numerous stone cells of varying shape and up to 125 microns in length, with thick, lignified, lamellated and porous walls; cork cells polygonal in surface view and frequently with lignified walls; numerous fragments of parenchyma some of the cells of which are rich in starch, others tannin, others containing gummy lignin which is insoluble in cold or boiling

water, cold concentrated potash solution, ammonia, alcohol or xylol but soluble in boiling nitric acid, boiling concentrated potash solution and hot solution of sodium hypochlorite; tracheæ from adhering wood few or absent.

CHEMISTRY OF BARKS OF MYRICA CERIFERA.

The chemistry of the root bark of *M. cerifera* has been investigated by Hambright[3] who found it to contain the following substances: albumen, tannic acid, gallic acid, starch, gum, red coloring matter, extractive, an acrid resin soluble in alcohol and ether, an astringent resin soluble in alcohol and insoluble in ether, myricinic acid, ligneous fiber, salts of potassa, salts of lime, protoxide of iron, magnesia and silicic acid. Chevalier[4] later reported a substance in certain cells of the root and stem of *Myrica cerifera* and other species which is insoluble in cold or boiling water, cold concentrated potash solution, ammonia, alcohol or xylol, but soluble in boiling nitric acid, boiling concentrated potash solution and hot solution of sodium hypochlorite. To this substance they assigned the name of "lignine gommeuse" (gummy lignin). The writer has not as yet found opportunity to conduct more than a few qualitative chemical tests on the material at hand. He is, however, able to report having found a tannin which gives a bluish black precipitate with ferric chloride T. S. in each of the three barks studied. In addition for each of the barks, he has also determined the presence of gallic acid, red coloring matter, starch and gummy lignin (lignine gommeuse).

Examination of three specimens of powdered bark showed an average of 3.05 per cent. of total ash.

PROPERTIES AND USES OF MYRICA BARK.

H. C. Wood[5] ascribes to the root bark moderate tonic and astringent properties. It is reported to have been used by various sects of medical men during the past century in the form of infusion, decoction and fluidextract for dropsical affections succeeding intermittents, in uterine hemorrhage, in dysentery, as a gargle in inflammation of the throat and as an astringent in sluggish circulation of the skin. The powdered bark has been applied as a stimulant to indolent ulcers. The astringent and tonic effects ascribed to it are undoubtedly due to the presence of tannin and gallic acid which has been determined by Hambright[3] for the root bark and by the writer for the aerial stem and rhizome barks. Each of the barks have a close similarity in odor and taste and are astringent in action.

SYNONOMY.

A long list of common names has been assigned to *Myrica cerifera* in the past. Among these were the following: Wax Myrtle, Bayberry, Candleberry, Wax Berry, Candelwood, Candle Tree, Tallow-shrub, Sweet Oak and Tallow-bayberry. Fernald and Robinson,[6] Britton and Brown[7] and other leading systematists, however, recognize and list most conspicuously the synonym for *Myrica cerifera* L. as Wax Myrtle and that for a closely related deciduous species, *Myrica Carolinensis Mill.*, as Bayberry.

SUMMARY AND CONCLUSIONS.

1. The majority of commercial specimens labeled "Bayberry Bark" examined by the author have been found admixed with rhizome and aerial stem bark or of rhizome bark only of *Myrica cerifera* L.

2. The physical characteristics of the root, rhizome and aerial stem barks of *Myrica cerifera* have been studied and collectively described.

3. Histological studies have been made on the authentic bark of roots, rhizome and aerial stem of *Myrica cerifera*, all of which were found to contain abundant tannin cells.

4. A number of commercial samples of "Bayberry" (Myrica) bark obtained during a period of five years were examined and compared with authentic materials collected by the author near Petersburg, New Jersey, the results observed agreeing with his previous conclusions.

5. The most important diagnostic difference between the three barks studied are given. It is shown that the root bark is devoid of a pericycle containing sclerenchyma fibers and stone cells, whereas the stem bark possesses a continuous or nearly continuous band of sclerenchyma fibers and stone cells in the pericycle and the rhizome bark a discontinuous zone of widely separated islets of narrow, comparatively thin-walled sclerenchyma fibers in this region.

6. The powdered bark of *Myrica cerifera* has been studied physically and histologically and its peculiarities described.

7. The writer has verified Hambright's observations so far as the presence of tannin, gallic acid, starch and red coloring matter in *M. cerifera* root bark are concerned and in addition has determined the presence of these constituents alike in the rhizomes and aerial stem barks of the same species.

8. Verification has also been made of the presence of lignine gommeuse in certain cells of the cortex and phloem of all three barks, as observed first by Tison and Chevalier.

9. Since leading systematists of the present day recognize Bayberry as the most common synonym for *Myrica Carolinensis* and Wax Myrtle as the most frequently employed one for *Myrica cerifera*, it seems advisable, in order to avoid confusion, to recommend that the present synonym appearing under Myrica in the National Formulary IV be changed in the present revision to Wax Myrtle or Wax Myrtle Bark.

10. Since all three barks of *Myrica cerifera* contain abundant tannin and gallic acid to which their astringent properties are due and since astringency seems to be the main dynamic property of Myrica bark and since the crude drug of commerce is frequently a mixture of root and rhizome barks or root, rhizome and aerial stem barks of *M. cerifera*, the author recommends that all of the bark of this plant be recognized in the next edition of the National Formulary, provided quantitative determination of the tannin in the three barks confirms the microscopic findings.

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DEPARTMENT OF BIOLOGY AND PHARMACOGNOSY,
PHILADELPHIA COLLEGE OF PHARMACY AND SCIENCE.

A MICROSCOPICAL COMPARISON OF SOME OFFICIAL HERBS AND THEIR SUBSTITUTES.*

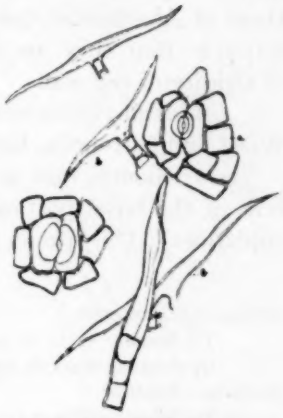
BY FANCHON HART.

The frequency with which some of the official herbs are adulterated in the powdered form has led me to undertake a description of the histological elements of a few common herbs, their adulterants and substitutes.

The first, *Artemisia Absinthium and Fallacious Species of Artemisia.*

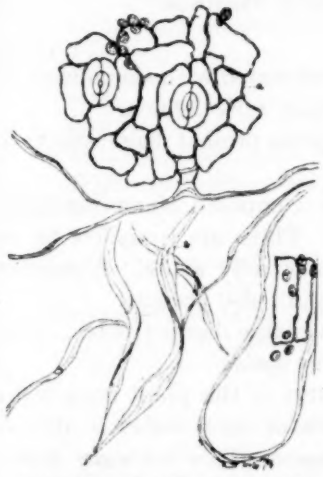
The second, *Arnica Montana and Its Substitutes.*

Bearing in mind that the characteristic and diagnostic elements of the genus are the trichomes apparent on the leaf epidermis, stoma and modifications of the epidermal cells, I shall limit my discussion to the anatomical features of these elements.

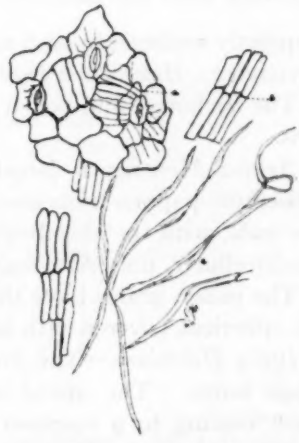


Artemisia Absinthium.—*a*, epidermis; *b*, trichome.

Artemisia Pontica, commonly called *Absinthium Petite*, is an inferior and worthless species imported from Europe and Asia. The two-armed or T-shaped hairs of this variety are about three times the length of the official absinth. The terminal cell of the *Pontica* trichomes are many times twisted, giving the appearance of cotton fibers. Although the hairs are distorted, the rigidity of the cell-walls prevent their collapse. This gives the trichome a jointed aspect. The terminal cells separate from the basal cells in powdering, while in the *Artemisia Absinthium* the terminal prolongations cohere to the basal portion. The epidermis of *Artemisia Pontica* is beaded and wavy. The guard cells surrounding the stoma are nearly as large as the true epidermal cells.



Artemisia Pontica.—*a*, epidermis; *b*, trichome.



Artemisia Maritima.—*a*, epidermis; *b*, palisade tissue; *c*, trichome.

Artemisia Abrotanum.—*a*, epidermis; *b*, trichome; *aj*, glandular hair; *c*, papillae.

* Scientific Section, A. Ph. A.

Artemisia Maritima is a native of the Mediterranean region.

The epidermal cells of the leaves of this plant present distinctive characters from those of the other *Artemisias*. The walls are more wavy than *Artemisia Absinthium*, but not beaded as in *Artemisia Pontica*. The long narrow palisade cells of the mesophyll adhere to the transparent epidermal cells, giving the latter a striated appearance. The guard cells of the stoma are manifestly smaller than those of *Absinthium Pontica*. The trichomes are similar to the trichomes of the latter in that they are thin and cotton-like, but differ from that variety in lack of rigidity of cell-wall.

Artemisia Abrotanum, known as Southern Wood, Sweet Benjamin, Smelling Wood and Citronella, has a lemon odor.

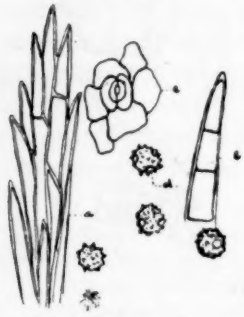
The trichomes that are present, differ from the above species in unity of the cells of the basal portion. Many papillae protrude from the wavy and striated epidermis. This species presents the greatest number of glandular hairs and stoma.

SUMMARY.

Artemisia Absinthium:
Trichomes—eight to ten times the width, broadest of the four varieties.
Epidermis—smooth and slightly wavy. Two oblong cells surround the guard cells.
Artemisia Pontica:
Trichomes—fifteen to thirty times as long as wide, tubular and twisted, cotton-like.
Epidermis—wavy beaded walls.
Artemisia Maritima:
Trichomes—cotton-like but collapsible, shorter by one-half than *A. Pontica*.
Epidermis—not striated and wavy, with adhering palisade tissue.
Artemisia Abrotanum:
Trichomes—basal and terminal portions intact, similar to *A. Absinthium*.
Epidermis—papillose and wavy, many glandular hairs.

Arnica Montana is frequently replaced by and adulterated with the flowers of *Inula Helenium; Inula Brittanica; Heterotheca Inuloides*, false Arnica.

The trichomes and pollen grains present diagnostic variations.



Arnica Montana.—*a*, trichome; *b*, trichome; *c*, epidermis; *d*, pollen.

Arnica Montana is largely composed of multicellular, multiseriate pappus trichomes. These are from five to six series wide, with the apical cells broadly acute. A number of multicellular, uniseriate hairs are also present.

The pollen grains have three large distinct pores. The cell is spherical, covered with large spines.

Inula Helenium.—The flowers of this plant have fewer pappus hairs. The apical cell of each series is thicker walled, coming to a rounded apex. This trichome differs from that of *Arnica Montana* in that the former is not as greatly laterally seriate. The pollen grains are smaller, spinose and papillose and devoid of pores.

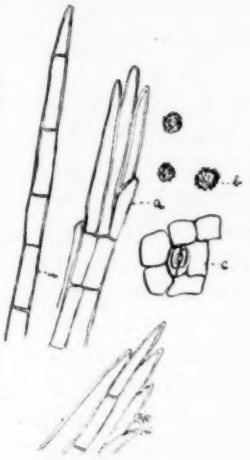
Inula Brittanica.—The tendency of the lateral processes to curve toward the base of the hair is peculiar to this species of *Inula*. Fewer series make up the trichome, and the component parts of each element are short with an acute apex.

The pollen grains are twice the size of *Inula Helenium*. They are three-lobed and sharply spinose.

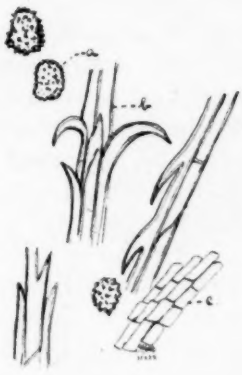
Heterotheca Inuloides, native of Mexico.

The multicellular trichomes are many more times seriate than the other false *Arnicas*. The uniseriate hairs are composed of as many as twelve cells.

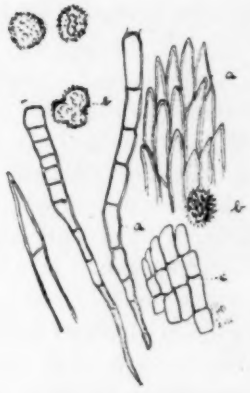
The pollen grains are three-lobed and thickly spinose.



Inula Helenium.—*a*, trichome; *b*, pollen; *c*, epidermis.



Inula Brittanica.—*a*, pollen; *b*, trichome; *c*, parenchyma.



Heterotheca Inuloides.—*a*, trichome; *b*, pollen; *c*, parenchyma.

SUMMARY.

Arnica Montana:

Trichomes—five to six series wide, apex acute.

Pollen—spinose, spherical and three pored.

Inula Helenium:

Trichomes—thick-walled apical cell, two to three series wide.

Pollen—small, spinose, papillose not pored.

Inula Brittanica:

Trichomes—short, curved apical cells.

Pollen—large three-lobed sharply spinose.

Heterotheca Inuloides:

Trichomes—many times seriate, rounded apical cells. Large many-celled uniseriate hairs.

Pollen—three-lobed, many short spines.

(To be continued)

DEPARTMENT MATERIA MEDICA,
COLUMBIA UNIVERSITY,
SCHOOL OF PHARMACY.

INTERNATIONAL CONGRESS OF PHARMACY.

The general meeting of the International Pharmaceutical Federation will be held in London, on July 23, 1923. The sessions will be held in the Great Central Hotel, Marylebone Road, N. W., where the British Pharmaceutical Conference will also meet. The Pharmaceutical Society of Great Britain invites the delegates and their ladies to attend the meeting of this pharmaceutical congress, which will be held from July 23 to 27, 1923, as well as the dinners, receptions and excursions which will take place on this occasion.

The secretary of the Local Committee of the British Pharmaceutical Conference, 17 Bloomsbury Square, London, W. C., will be pleased to supply members taking part in the general meeting with full particulars regarding accommodation in the Great Central Hotel, and to retain rooms for them in this or any other hotel in London.

ALKALOIDAL ASSAYS OF DELPHINIUM ANDERSONII, GRAY.*

BY M. R. MILLER.†

A number of species of Delphinium, the larkspurs, have been investigated chemically on account of their physiological activity. Poisoning of range animals, particularly in the West, has led to the examination of suspected species with the result that a number are known definitely to contain poisonous alkaloids, while others have only been reported as poisonous.

The properties of mixtures of alkaloids obtained from *Delphinium bicolor*, *D. menziesii*, *D. scopulorum*, and *D. nelsonii* have been described by Heyl.[1] The quantities in which the alkaloids were present varied from 0.27 to 1.20 per cent. Keller[2] obtained alkaloids from the seeds of *D. consolida*, but not in the blossoms. *Delphinium nelsonii* was reported by Loy, Heyl, and Hepner[3] to contain crude alkaloids as follows: flower, 0.79 per cent.; pod, 0.60 per cent.; seed, 1.27 per cent.; leaf, 0.34 per cent.; and root, 0.48 per cent. In *D. glaucum* there was found: flower, 0.77 per cent.; leaf, 0.62 per cent.; and root, 1.79 per cent. In *D. geyeri:* leaf and stem, 1.15 per cent.; and root, 0.93 per cent. The physical properties of the poisons obtained by Beath[4] from *D. geyeri* and *D. subalpinium* (*D. barbeyi*) were found to present striking resemblances. *Delphinium geyeri* yielded amorphous alkaloidal products only, while *D. subalpinium* yielded a crystalline alkaloid only in the early stages of growth. It was reported by this author that the crystalline alkaloids combine with an acid similar to aconitic acid to form an amorphous alkaloidal product with a greater toxicity than the crystalline alkaloid. *Delphinium geyeri* was found to contain crude alkaloids to the extent of 1.5 per cent. in the stems and leaves of early growth. The mature stems and flowers contained 0.7 per cent. crude alkaloids. *Delphinium subalpinium* contained smaller quantities, *viz.*, 0.7 per cent. crude alkaloids in the early growth and 0.3 per cent. in the mature leaves, stems and flowers. The crude alkaloids found in the stems and leaves of *D. glaucescens* at the early growth stage is reported as 0.6 per cent. The mature leaves, stems and flowers were found to contain less than in the early growth, namely, 0.25 per cent.

Thus, while the literature contains data on a number of species of Delphinium, nothing has been found in regard to the amounts or kinds of alkaloids to be found in *D. andersonii*. *Delphinium andersonii*, one of the low larkspurs, so named from its habit of growth in distinction to the tall larkspurs as represented by *D. glaucescens*, is found in abundance in certain areas of Nevada and has been found to be responsible for cattle losses under certain conditions. The roots of this species have been reported harmless by Marsh, Clawson and Marsh[5] when fed to sheep but the above-ground parts have been found, at this Station, to be toxic to cattle.

As there was not sufficient material available for the preparation of the alkaloids, alkaloidal assays were made on the leaves and stems of the plant. The plants had been collected for use in feeding tests at the stage just before flowering from an area near Carson City, Nevada, and the samples received at the laboratory were in a badly wilted condition. The material, comprising principally the above-

* Published by permission of the Director of the Nevada Agricultural Experiment Station.
† Chemist, Nevada Agricultural Experiment Station.

ground portions, were allowed to become air-dried after which the material was finely powdered and moisture determinations made. From the moisture data the contents of alkaloids found were calculated to dry material basis.

For the determination of the alkaloids, two methods were employed: (*a*) the method used by Beath,[4] (*b*) the U. S. P. method for the assay of belladonna leaves. The methods are given briefly as follows:

(*a*) Twenty-five grams of powdered air-dried material are percolated free from alkaloids with 90% alcohol. The percolate, concentrated to approximately one-third its volume under reduced pressure, is made faintly acid with 1% sulphuric acid and concentrated further by means of a current of air. The concentrated aqueous solution, after washing with petroleum ether, is made alkaline with ammonium hydroxide and the alkaloids extracted with chloroform. The alkaloidal extract after removal of the solvent, is taken up with $N/50$ sulphuric acid, the excess titrated with $N/50$ potassium hydroxide (lacmoid indicator) and the alkaloidal content calculated as delphinin ($C_{31}H_{49}O_7N$).

(*b*) Twenty-five grams of powdered air-dried material are extracted in the presence of a little ammonium hydroxide with a chloroform-ether mixture, first by shaking in a flask and then by percolation. The percolate is run into dilute sulphuric acid and when percolation is complete the alkaloids are removed from the solvent by shaking. The acid solution is then made alkaline with ammonium hydroxide and the alkaloids extracted with chloroform. The chloroform is driven off, the residue taken up with standard sulfuric acid and the excess titrated with a volumetric solution of potassium hydroxide, using cochineal or iodeosin as indicator. The alkaloidal content is calculated as delphinin as above.

The results obtained by the two methods were:

No.	Method.	Alkaloid, %
1	(*a*)	1.90
2	(*a*)	1.75
3	(*a*)	1.76
4	(*b*)	1.64

In the application of method (*a*) the aqueous solution could not be washed by petroleum ether to a yellow color, as was found by Beath, but retained enough coloring matter to cause it to be of a dark color. Troublesome emulsions were encountered during the chloroform extractions. Cochineal proved to be more satisfactory as an indicator than lacmoid or iodeosin as advised in the procedures.

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THE CHEMISTRY OF DIGITALIS.

BY HERBERT C. HAMILTON.

Since first bringing this subject forward two years ago little progress has been made worthy of publication. My object at this time is not so much to present new facts as to review the present condition of the problem and make clear just what is the nature of the barrier to progress.

It is possible to separate from an extract of digitalis leaves—an extract preferably prepared by use of 70% alcohol—very active material almost as toxic as digitoxin, 1 Gm. of which represents about 100 Gm. of digitalis leaves of average quality. Attempts to purify this further by separating an active from an inactive part have so far proved fruitless. It is apparently possible to separate this material into two parts, one soluble and one insoluble in chloroform. This is an inexact separation since neither part is absolutely true to its apparent characteristic, for repeated applications of the solvent will change slightly their relative proportions, without, however, causing either to disappear or to become inert.

Both parts respond to the color test of Keller's reagent exactly alike and practically identical with the test for digitoxin (U. S. Dispensatory). But the more active of the two parts is insoluble in chloroform and ether while digitoxin is said to be readily soluble. While neither part is soluble in water to an appreciable extent the part insoluble in chloroform dilutes with water to a clearer solution than the other and remains in solution even when the alcohol has been completely driven off by heat. This suggests a commercial outlet for such a product in spite of its apparent insolubility.

The most logical application of the isolated substances is in alcoholic solution in a strength somewhat greater than that of the U. S. P. tinctures. In this form it is a very pale straw color and with an activity of 6 H. T. U. per milligram—this being the activity of the official tincture digitalis per cc.

In this form it is greatly increased in stability and should represent a distinct advance in the pharmacy of this useful drug.

The difficulties in the way are inability to purify to an absolutely uniform activity; inability to eliminate one or the other of the two constituents which have so many points of similarity as well as being indistinguishable pharmacologically; inability to obtain a water-soluble product suitable and convenient for clinical application.

One point I wish to emphasize is this—that no step in the process of purification can by any possible means have changed the chemical or pharmacological properties of the active agents from the form and the action they (or it) had in the original state since the purification is entirely accomplished by means of immiscible solvents or combinations of solvents and by precipitants which combine only with the inert material.

Whatever active agent (or agents) is prepared, therefore, is not a changed product but represents the original drug in every respect.

DEPARTMENT OF MEDICAL RESEARCH,
PARKE, DAVIS & CO., DETROIT, MICH.

SOME NOTES ON EXTRACT OF CASCARA AND CASCARA EXTRACTION.*

BY F. W. NITARDY.

The U. S. P. IX directs extract of cascara to be made by extracting the bark with hot water, concentrating the percolate, drying the extract and finally diluting it so that one gram of extract represents three grams of the drug from which it was made.

Cascara in common with most drugs varies in the amount of extractive a perfectly dry bark will yield. According to the place in which it is stored and the prevailing weather conditions or humidity it also varies in moisture content. To adjust the extract to a definite ratio of drug, therefore, does not seem conducive to producing a preparation of uniform strength. Unfortunately, there is no practical method of determining the activity of this drug by either chemical or physiological means. However, it seems reasonable to assume that there may be a fairly definite relation between the extractive content and activity of the drug and that a more uniformly active extract would be produced if the dilution to definite drug ratio were omitted.

A questionnaire on this and other points in reference to cascara was sent to the leading pharmaceutical manufacturing houses of the country. An abstract of the questions asked and answers obtained is appended to this paper in tabulated form. It will be noted that out of five answers received to this question three state they believe the activity is proportional to extractive content. One house answers that it could establish no such relations and one believes it difficult to give an opinion because of lack of any adequate method for determining the activity of the drug or its preparations. Three other houses answering other questions made no comment on this one.

Among the diluents prescribed to be added to extract of cascara U. S. P. IX, there is a given amount of magnesium oxide. It is well known that the use of magnesium oxide as a debitterizing agent in the manufacture of aromatic fluidextract of cascara reduces the activity of this preparation to a considerable extent. The question has therefore been raised as to whether this addition of magnesium oxide to the finished powdered extract may have a detrimental effect on its efficacy as a laxative. So far as I know it is not definitely known whether the debitterizing action of magnesium oxide is due to rendering certain principles insoluble, thereby preventing their extraction, or whether they are destroyed or altered in their composition so that they lose their cathartic action and bitter taste, but are extracted along with other constituents. Further, it is not known in case they are rendered insoluble whether this affects their value therapeutically. From experience in the manufacture of the aromatic fluidextract it appears that the action of magnesium oxide is more thorough in the presence of air. That is, a better debitterizing effect is obtained if the drug is dried after mixing with water and magnesium oxide than when it is only macerated and then percolated without previous drying. This suggests that the exposure to air may facilitate whatever action or reaction takes place.

In experimental work conducted on extract of cascara it was found that this

* Scientific Section, A. Ph. A., Cleveland meeting, 1922.

QUESTIONNAIRE.

Questions.	*Answers.* A.	B.	C.	D.
What is the effect of MgO on cascara? Is MgO a satisfactory diluent in extract of cascara?	Any alkali reduces activity, degree depending on strength of alkali and length of treatment.	MgO reduces activity of cascara as evidenced by debitterized preparations.	MgO lessens activity probably by combining with principles. In its addition to extract it has less chance for action. Do not use it.	MgO, CaO and other alkalis appreciably reduce activity. MgO either decomposes or renders insoluble active constituents. Do not consider its use in extract detrimental.
What is the yield of extractive—high, low and average? What is its relation to drug activity?	24–29%, average 26%. Activity of drug proportional to extractive present.	At one time judged value of bark by extractive present but abandoned this 20 yrs. ago because no relation could be established.	Average yield 25%. Hard to reach conclusion as to relation of activity to extractive content.	Well-aged dry bark yields 20–27%, average of 25% extractive.
Is there any practical method of determining activity?	No satisfactory method of determining activity except by clinical trial.	Determination of activity practically impossible except by clinical experiment.	No practical method of assay. Chemical methods not sufficiently developed; clinical tests inadequate.	Chemical method absolutely useless and unreliable. Clinical method not satisfactory. Anthraquinone derivatives no index of activity.
Is water the best menstruum? Do hydro-alcoholic menstruums give better extraction? What will such menstruum yield in extract?	Hot water best menstruum.	Water satisfactory menstruum but believe addition of 1% NH_4OH better solvent.	Water best menstruum from economic standpoint. Dil. alc. yields complete but lighter extract.	Hot water and vacuum evaporation yields active extract. Hydro-alcoholic menstruum gives more clean-cut extraction and a more fluid preparation.
	E.	F.	G.	H.
	MgO does not influence emodin content but lessens bitter principle. Doubt that it is detrimental in extract. It may combine and split up again in the body, merely a supposition.	MgO lessens activity. Its effect on extracts may be detrimental even though we have no definite evidence thereof.	MO lessens activity, not known if due to elimination of tonic effect or due to destruction of some of the active constituents. It acts on extract as shown by color change (purplish). Should not be used.	Effect of MgO on extract cannot be compared to debitterizing action in fluidextract, as it is added to dry extract.
	Yield 25–30%. Low extractive always means low activity. Usually due to fresh bark. The latter also has tendency to gripe.	Average yield about 25%. Some yield as low as 20%, some as high as 30%. Believe activity proportional to extractive.		30–33% extractive.
		Chemical and clinical methods unsatisfactory. Clinical trial would be OK if patient could be standardized.	Clinical trial only will give index of strength.	No practical method available.
	Water is the best menstruum. 38% alcohol yields about the same amount of extractive but offers no advantage.	Hot water is a satisfactory menstruum. Alcoholic menstruums yield less extractive.	Water is the best menstruum.	Water is the best menstruum.

extract may be dried and powdered satisfactorily without the use of magnesium oxide. It is, however, somewhat difficult to accomplish this during humid weather. It was further found that if magnesium oxide is added to the soft extract previous to drying, the drying operation is accomplished very much more rapidly and easily than when the U. S. P. procedure is followed. In an effort to determine if there is any difference in therapeutic activity between extract of cascara made without the addition of magnesium oxide and that made with the addition of the amount called for by the U. S. P. both before and after drying, a given lot of cascara was extracted and the soft extract obtained divided into three portions, one portion of which was dried and brought to U. S. P. standard ratio by dilution with an inert substance. The second portion was mixed with the required amount of magnesium oxide, dried and then diluted with an inert substance to U. S. P. strength. The third portion was dried and the dried product was diluted to U. S. P. strength with magnesium oxide of the required quantity and sufficient inert material. Samples of all three were sent to our biological laboratories with the request that they be tested therapeutically by administration to animals. The report received on these tests, however, is not satisfactory or conclusive of any difference in therapeutic activity between the three products. Differences were noted but consistent results were not obtained. I tested these extracts personally but found it difficult to reach definite conclusions on their relative activity. In discussing this matter with Dr. James A. Beal at the New Orleans meeting, he kindly consented also to give these three samples of extract a personal test. I now have his report that he found all three extracts of excellent quality and, apparently, equally active.

It would probably be difficult to definitely prove that magnesium oxide is or is not detrimental to extract of cascara except by clinical tests covering thousands of cases. Should it be proved that magnesium is not in any way harmful to the product, it would certainly be desirable to add it to the moist extract before drying. In order to make sure, it may be best to omit the magnesium oxide from extract of cascara until such time as more is known on the subject, especially as its preparation without magnesium oxide offers no particular difficulty.

I have searched literature for information on the extraction of cascara but find that very little of value in connection with the manufacture of an extract or a fluidextract is available. I therefore determined to have some experiments made on the extraction of the bark for the purpose of determining what type of extractive and amount of extractive various solvents would remove from a given sample. For this purpose I selected a bag of cascara bark from stock, set half of it aside as an authentic sample, the other half I had ground and a portion of the ground drug was then extracted as follows: first, with ether, drying the marc and evaporating the ethereal percolate to a solid extract. The dried marc was then repacked and extracted with acetone. The same procedure was repeated subsequently, using alcohol, dilute alcohol and hot water as a menstruum; in each case evaporating the percolates to a dried extract and carefully drying the marc before the next extraction was attempted. On another portion of the same drug the same process was carried out in reverse order, *i. e.*, starting with hot water and ending up with ether. The results obtained from these extractions are shown on the following table, which gives the number of grams of dried extract obtained per kilo of drug used and also the percentage of the extract that was found to be water-sol-

uble. You will note that the ether extract could not be dried down to a dry solid on account of its oily nature. Further experiments along this line have been planned, but have as yet not been completed.

EXPERIMENT WITH THE EXTRACTION OF CASCARA BARK WITH A SERIES OF MENSTRUUMS.

Experiment No. 1.

Menstruum and order of extraction.	Yield of dry extract, %.	Remarks.
Ether	4.0	Bitter, tarry, insoluble in water, melts on heating.
Acetone	10.0	Bitter, 60.7% water-soluble.
Alcohol	11.0	Bitter-sweet, then acrid bitter, 82.5% water-soluble.
Dilute alcohol	9.0	Flat, faintly bitter, 83% water-soluble.
Hot water	1.7	Flat, faintly bitter, 82.2% water-soluble.
Total extractive all solvents	35.7	

Experiment No. 2.

Menstruum and order of extraction.	Yield of dry extract, %.	Remarks.
Hot water	27.0	90.8% water-soluble.
Dilute alcohol	4.5	Bitter oily taste, 63.2% water-soluble.
Alcohol	3.0	Tarry, oily taste.
Acetone	.45	Waxy, taste flat.
Ether	(.30)	Amount estimated at 0.3% extract was lost through accident in drying.
Total extractive all solvents	35.25	

One of the objects of making these experiments was to determine if some other method of removing the bitter principle from cascara would be more satisfactory than the one now employed as by the present method a large amount of the activity of the drug is lost. I have heard that one may exhaust cascara with certain organic solvents, thereby obtaining a bitter cathartic principle and rendering the bark bitterless. This bitter cathartic principle I am told is made use of under the name of Cascarin and the bitter free bark is then available for the preparation of an aromatic fluidextract. However, I have no definite information on this subject and do not know whether this practice is really followed.

Further work on this subject is under way and contemplated and I hope to make an additional report at next year's meeting.

LABORATORIES OF E. R. SQUIBB & SONS.

A COMPARISON OF CANE AND BEET SUGAR FOR PHARMACEUTICAL PURPOSES.*

BY ADRIAN THOMAS.

For a long time there has been a question, especially among manufacturers of pharmaceutical preparations, whether there is a difference between products made with a cane or beet sugar. The experiments recorded here were conducted in order to ascertain if any marked difference existed between sugars from the two sources or between solutions of them. Four samples of cane sugar and four samples of beet sugar were examined, each sample being representative of a car lot.

* Scientific Section, A. Ph. A., Cleveland meeting, 1922.

CHEMICAL EXAMINATION.

Polariscopic examinations were made but revealed no difference between the two kinds of sugar. Direct readings, and also readings after inversion were taken, the sucrose being then calculated by the formula of Clerget. The sucrose content of all samples was found to be above 99% and no differences were observed which might not be considered within the experimental error and within the limits of accuracy of the polariscope used. Therefore these results were not considered to be of any great value by themselves.

Determinations were made of the moisture, ash, nitrogen and reducing sugar, calculated as *invert* sugar, in the eight samples. The results are given in Table I.

TABLE I.

Sample.	Moisture, %.	Ash, %.	Nitrogen × 6.25, %.	Invert sugar, %.
1-Cane	0.030	0.020	0.075	0.013
4-Cane	0.035	0.005	0.026	0.027
5-Cane	0.030	0.010	0.052	0.030
6-Cane	0.020	0.010	0.018	0.021
2-Beet	0.030	0.010	0.022	0.004
3-Beet	0.050	0.005	0.043	0.003
7-Beet	0.044	0.005	0.000	0.020
8-Beet	0.050	0.005	0.020	0.008
Average for cane	0.029	0.011	0.043	0.023
Average for beet	0.044	0.006	0.021	0.009

The averages would make it appear that the beet sugars contained less of these impurities than the cane sugars, but if the analyses of the individual samples are examined, it will be seen this does not entirely hold true; however, any differences in the sugars could not be attributed to these small amounts of impurities.

The reducing sugars were in such small quantities that the ordinary methods of determination were not applicable. The method used was that given by Bates and Jackson[1] and employed a modified Soldaine reagent containing 300 Gm. $KHCO_3$ and 1 Gm. $CuSO_4.5H_2O$ per liter. Bates[2] found that most samples of both beet and cane sugar examined were of remarkable purity; he even found some beet sugar to polarize above 100° owing to the presence of raffinose. This high degree of purity is in accordance with the present findings.

FERMENTATION WITH YEAST.

A series of solutions of different concentrations was made from each of the eight sugars. These were put in fermentation tubes and inoculated with 0.1 cc of a yeast suspension containing 10 Gm. of compressed yeast per 100 cc. The rate of growth of the organisms was recorded after 48 hours, the amount of gas formed, rather than a count of yeast cells, being taken as an index of growth. The gas was then released and the solutions inoculated with an additional 1.0 cc of a yeast suspension of the same concentration and the growth as indicated by the amount of gas formed, was noted after 24 hours. The tubes were kept at room temperature (20° C. to 25° C.). The results of these fermentation tests are given in Table II.

[1] U. S. Bur. of Standards, *Sci. Paper* No. 268.

[2] F. J. Bates, Abs. in *Int. Sugar J.*, 22, 654, 1920.

In this table the customary bacteriological notation is used. Minus (−) indicates the absence of gas, plus (+) the presence of gas, the relative amount being expressed by the numerical coefficient 6+ indicating that the arm of the fermentation tube was filled with gas.

TABLE II. FERMENTATION OF SUGAR SOLUTIONS WITH YEAST.

Concentration, per cent.	Sample. No. 1. Cane.	No. 4. Cane.	No. 5. Cane.	No. 6. Cane.	No. 2. Beet.	No. 3. Beet.	No. 7. Beet.	No. 8. Beet.	
10	4+	3+	3+	+	3+	5+	3+	5+	
20	4+	2+	4+	2+	5+	3+	2+	3+	
30	+	+	4+	2+	5+	+	3+	6+	
40	4+	*a*	+	+	3+	+	2+	4+	Gas produced in 48 hrs. after inoculation with 0.1 cc yeast suspension.
50	*a*	4+	3+	*a*	—	—	+	5+	
60	*b*	2+	2+	—	—	—	4+	3+	
70	—	*a*	—	—	*b*	—	*a*	*a*	
80	—	*b*	—	—	—	—	—	—	
*85	—	—	—	*a*	—	—	—	—	
10	6+	6+	6+	6+	6+	6+	6+	6+	
20	6+	6+	6+	6+	6+	6+	6+	6+	
30	6+	6+	6+	6+	6+	6+	6+	6+	
40	6+	6+	6+	6+	6+	6+	6+	6+	Gas produced in 24 hrs. after inoculation with 1.0 cc yeast suspension.
50	6+	6+	6+	5+	*a*	+	6+	6+	
60	5+	6+	5+	2+	*b*	*b*	6+	6+	
70	3+	3+	+	+	6+	2+	2+	2+	
80	—	*b*	—	—	*b*	+	*b*	*b*	
85	+	—	—	*b*	+	—	—	—	

a indicates a small bubble.

b indicates a minute bubble.

* 85% sugar solution corresponds to the U. S. P. simple syrup.

Upon examination of Table II it will be seen that as the concentration of the sugar solution approaches 85%, the fermentation decreases. Only three samples showed any fermentation at all at this concentration, one being a beet sugar and two, cane; one of the latter, however, exhibited only a small bubble of gas.

MOULDS AND BACTERIA.

It was desired to know to what extent organisms were present in the sugar as received. For this purpose fifteen grams of sugar were dissolved in sterile distilled water and made to 100 cc in sterile flasks. One cubic centimeter of the resulting solution was plated out in sterile Petri dishes with nutrient agar. Duplicate solutions and plates were made of each sugar, one set being cultured in an incubator at 30° C., the other being allowed to stand at room temperature (20° C. to 25° C.). After three days the plates and solutions were examined for growth and then allowed to incubate for twenty-four hours longer when counts of the plates were made. The results of this set of experiments is recorded in Table III.

From the bacteria and mould counts which were made the average number of bacteria and mould spores per gram of sugar may be calculated. These calculated numbers are given in Table IV. While only approximate, they may serve for comparison.

TABLE III.—BACTERIA AND MOULDS IN SUGAR.

	Growth in solutions.				Growth on plates.					
	After 3* days.		After 4 days.		After 3* days.		Colonies after 4 days. Mould.		Bacteria.	
Sample.	Room temp.	30° C.	Room temp.	30° C.	Room temp.	30° C.	Room temp.	30° C.	Room temp.	30° C.
1-Cane	±	—	+	+	—	+	0	4	1	1
4-Cane	—	—	+	+	±	+	1	2	2	0
5-Cane	+	+	+	+	+	±	1	0	0	1
6-Cane	+	—	+	+	—	±	0	X	1	X
2-Beet	+	+	+	+	+	±	4	X	1	1
3-Beet	±	±	+	+	+	+	1	2	4	2
7-Beet	±	+	+	+	—	+	2	3	6	11
8-Beet	+	+	+	+	+	+	1	1	8	7

* For samples No. 7 and No. 8 data are recorded after two days instead of three.
X indicates colonies having spread to such an extent as to make count impossible.

TABLE IV.—BACTERIA AND MOULD SPORES PER GRAM OF SUGAR.

	Mould spores incubating at		Bacteria incubating at	
Sample.	Room temp.	30° C.	Room temp.	30° C.
1-Cane	0	26	6	6
4-Cane	6	13	13	0
5-Cane	6	0	0	6
6-Cane	0	X	6	X
2-Beet	26	X	6	6
3-Beet	13	6	16	13
7-Beet	13	20	73	40
8-Beet	6	6	53	46
Average for cane sugar	3	13	6	4
Average for beet sugar	11	14	26	39

X indicates colonies having spread to such an extent as to make count impossible.

It would appear from these figures that the samples of beet sugar were on the average contaminated with a greater number of organisms than were the samples of cane sugar. The bacteria were not identified but the moulds belonged to the *mucor*, *aspergillus* and *penicillium* groups.

KEEPING QUALITIES OF SYRUPS.

In order to observe any difference in the keeping qualities of syrups made from the two sugars under ordinary conditions, a series of syrups ranging in concentration from 10% to 85% were made from each sample of sugar, ordinary distilled water being used as a solvent. Each syrup was then divided into three portions. One portion was put in Erlenmeyer flasks, plugged with cotton and sterilized 20 minutes under 15 lbs. steam pressure. A second portion was put into bottles, which had been thoroughly washed, and tightly corked. The third portion was put into bottles the same as the second portion, but was afterwards inoculated with a mixed culture of moulds and bacteria taken from the plates upon which the counts were made. It is needless to say that in no case was any growth observed in the series which had been sterilized.

In Table V are shown the relative growths obtained in the inoculated syrups and in syrups where growth was allowed to develop spontaneously. All these syrups were held at room temperature. No active fermentation was noted and no pressure was developed in the tightly corked bottles so it may be concluded that gas-producing organisms were absent. The growths appeared to be chiefly due to moulds. These were largely confined to the surface.

A close examination of Table V discloses that in the case of the syrups in which the organisms were allowed to develop spontaneously, there is but little difference in the rate of growth in syrups made from beet or cane sugar, but in the case of the inoculated syrups organisms developed at a slightly more rapid rate in beet sugar syrups.

TABLE V.—RATE OF GROWTH OF ORGANISMS IN SYRUPS.

	Sample.	Period of growth, days.	Concentration. 10%.	20%.	30%.	40%.	50%.	60%.	70%.	80%.	85%.
Spontaneous growths	1-Cane	7	+	+	+	+	+	+	+	+	—
		14	+	+	2+	2+	2+	2+	2+	2+	±
		42	+	+	2+	2+	2+	2+	2+	3+	+
	4-Cane	7	—	±	+	+	2+	—	—	—	—
		14	±	±	+	+	2+	±	—	—	—
		42	+	+	2+	2+	2+	2+	2+	+	+
	5-Cane	7	+	+	2+	2+	2+	±	±	—	—
		14	+	+	2+	2+	2+	+	+	+	±
		42	+	+	2+	3+	3+	2+	2+	+	+
	6-Cane	7	+	2+	2+	2+	2+	2+	±	—	—
		14	2+	2+	2+	2+	2+	2+	+	±	+
		42	2+	3+	3+	3+	2+	2+	2+	2+	2+
	2-Beet	7	±	±	±	±	+	+	+	—	—
		14	+	+	+	2+	2+	2+	2+	—	—
		42	2+	2+	2+	3+	4+	4+	3+	2+	2+
	3-Beet	7	+	+	2+	2+	2+	+	±	—	—
		14	+	+	2+	2+	2+	+	+	+	—
		42	+	+	3+	4+	4+	4+	4+	2+	2+
	7-Beet	7	2+	+	+	2+	2+	+	±	—	—
		14	2+	+	+	2+	3+	2+	+	—	—
		42	2+	+	+	2+	3+	2+	+	±	±
	8-Beet	7	2+	+	+	±	+	±	—	—	—
		14	2+	+	+	+	+	±	—	—	—
		42	2+	+	+	+	+	+	±	±	±
Growth after inoculation	1-Cane	2	2+	2+	2+	2+	2+	+	+	+	±
		10	2+	2+	2+	2+	2+	+	+	2+	+
		42	2+	3+	2+	2+	2+	+	+	3+	+
	4-Cane	2	+	+	+	2+	+	+	+	±	±
		10	+	+	+	2+	+	2+	+	+	+
		42	2+	+	2+	2+	2+	2+	2+	+	+
	5-Cane	2	+	+	+	+	±	±	±	±	±
		10	2+	2+	2+	+	+	+	+	+	+
		42	2+	2+	2+	2+	3+	2+	2+	2+	+
	6-Cane	2	+	2+	+	+	+	+	+	±	±
		10	2+	2+	2+	2+	+	+	+	+	+
		42	3+	3+	3+	3+	2+	2+	2+	2+	2+
	2-Beet	2	+	+	+	2+	2+	2+	2+	±	±
		10	+	+	2+	3+	3+	2+	2+	+	+
		42	2+	2+	4+	4+	4+	4+	3+	2+	2+
	3-Beet	2	+	+	2+	2+	2+	2+	+	±	4+
		10	+	+	3+	2+	2+	2+	2+	+	2+
		42	2+	2+	2+	4+	4+	4+	4+	2+	2+
	7-Beet	2	2+	+	2+	2+	2+	2+	+	±	—
		10	2+	+	2+	2+	3+	2+	2+	+	±
		42	3+	2+	2+	3+	3+	3+	2+	2+	+
	8-Beet	2	2+	2+	2+	2+	2+	±	±	—	—
		10	2+	2+	2+	2+	2+	+	+	±	±
		42	3+	3+	3+	3+	3+	2+	+	+	+

When first made, no difference in color could be detected between beet or cane sugar syrups of the same concentrations. Upon the development of moulds, some of the syrups became discolored; this, however, was noted in both cane and beet sugar syrups.

Shaw[3] has compared the merits of beet and cane sugar for preserving fruits and making jellies and has found the two sugars to have almost the identical sucrose content, which would be expected. He also found no difference between jellies made with beet and cane sugar, and of 2000 cans of preserved fruit he found but 6 from the beet sugar lot and 7 from the cane sugar lot to spoil during two years of storage. This loss, it is stated, was due to imperfect sealing.

From the evidence at hand it appears that beet and cane sugar may be used with equally good results for all purposes. The process of refining sugar has been so perfected that a uniform product can be supplied. The greatest source of danger, it seems, is contamination by moulds and bacteria, but with modern processes of refining both beet and cane sugar may be produced equally free from contamination by organisms.

SUMMARY.

Chemical and polariscopic examination failed to establish any difference between the beet and cane sugars examined, though of the almost negligible amounts of ash, nitrogen and invert sugar found in both the beet and cane sugar samples, the cane sugar, on the average, contained the most.

Fermentation with yeast showed the process to proceed the same for both sugars.

Of the eight samples examined, more organisms were found in beet than in cane sugar. Any difference between given samples of the two sugars must be concluded to be due to the degree of refinement or to contamination by moulds and bacteria, the latter being the more probable.

PAPER NO. 19.
CHEMICAL RESEARCH DEPT.,
PARKE, DAVIS & COMPANY.

A METHOD FOR MANUFACTURING ETHYL OENANTHYLATE.*

BY CHARLES H. ROGERS.

Nearly all fruits possess very distinctive flavors and these flavors may be imparted to such substances as confections, jellies, ice cream, etc., by simply mixing in sufficient quantities the fruit, either in preserved or fresh form or the juice therefrom, with the material. In many instances, however, it is not practical to prepare an extract from the respective fruits which is sufficiently concentrated to give the desired fruit flavor when used in moderate quantities. These conditions have led to the use of artificial fruit essences which are made up of esters, alcohols, aldehydes, lactones, etc., mixed in various combinations and proportions to imitate more or less the various fruit flavors. In concentrated form these artificial flavors are usually more pungent and crude smelling than the sapid and odorous principles

[3] G. W. Shaw, *Univ. of Cal. College of Agr., Cir.* No. 33, 1907.

* Northwestern Branch A. Ph. A., February meeting, 1923.

of fruits which they are supposed to imitate. Food products flavored with artificial essences are unquestionably lacking in delicacy and refinement; nevertheless, they do have a semblance of the flavor of the true fruit. These essences are of value because the original fruit flavor may be had in a highly concentrated form.

Many esters alone possess very distinctive flavors and are often sold as artificial oils of the respective fruits which they represent. Examples: pineapple oil is ethyl butyrate; banana oil, amyl acetate; apple oil, amyl valerianate, etc.

In reviewing the work that has been done on artificial essences it is found that one ester in particular is used more than any other in making complex mixtures used to imitate various fruit flavors. It was observed that oenanthylic ethyl ester plays an important part in the manufacture of raspberry, gooseberry, grape, cherry, apricot, currant, bourbon, and other artificial essences. Ethyl oenanthylate may be purchased in the open market but this product is made by esterifying cocoanut oil and is a mixture of the ethyl esters of lauric, myristic, palmitic, and other higher fatty acids. A review of the literature dealing with the manufacture of ethyl oenanthylate has led us to a study of the methods suggested for its preparations. It is the purpose of this paper to discuss the one method of preparing pure ethyl oenanthylate that was used successfully in our laboratory.

PREPARATION OF OENANTHOL (NORMAL HEPTALDEHYDE).

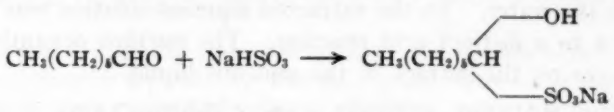
Three hundred grams of No. AAA castor oil were placed in a round-bottomed, long-necked, one-liter distilling flask which was connected by a cork stopper and glass tube to a water condenser. The jacket of the condenser contained cold water, but not running water. Experiments have shown that if the delivery end of the condenser be fitted into a suction flask and a partial vacuum produced, the distillation will proceed more rapidly, although extra precaution must be taken to prevent foaming. The flask was then heated on a sand-bath with a triple Bunsen burner. A few small pieces of clay were introduced into the flask to prevent bumping. The distillation was continued until the odor of acrolein became very noticeable and only small amounts of the substance distilled. This required about four hours. The decomposition of the castor oil sometimes takes place very rapidly. In fact, this reaction often occurs with sufficient explosive violence to blow the cork out of the distilling flask and discharge the contents. This is to be guarded against because the material that is expelled closely resembles an asphaltic paint and is most difficult to clean from anything with which it comes in contact. The residue in the flask should be poured out while still hot or else the flask is very hard to clean. The following reaction takes place:

$$\underset{\text{Ricinoleic acid}}{CH_3(CH_2)_5.CH(OH).CH = CH.(CH_2)_8COOH} \longrightarrow \underset{\text{Oenanthol}}{CH_3(CH_2)_5CHO} + \underset{\text{Undecylenic acid}}{C_{10}H_{19}COOH}$$

FORMATION OF THE BISULPHITE ADDITION PRODUCT.

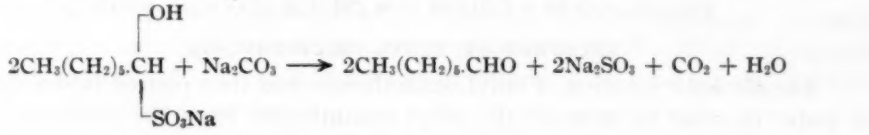
The distillate, which consisted of oenanthol and water, was placed in a separating funnel and the water drawn off. The aldehyde was then run into a 500-mil Erlenmeyer flask and shaken with a cold, saturated aqueous solution of sodium bisulphite for about ten minutes and then allowed to stand for an hour. The sodium bisulphite solution was prepared by saturating a solution of fifty grams of sodium hydroxide in 200 mils of water with sulphur dioxide; oenanthol bisulphite separates

and may be filtered off on a Hirsch funnel and washed with a little cold water.



REGENERATION OF OENANTHOL.

A two-liter flask was filled one-third full of a saturated solution of sodium carbonate. To this was then added from 100 to 150 grams of the sodium bisulphite addition product of oenanthol. A condenser was connected to the flask and also a tube introduced that reached to the bottom of the same and through which steam could be introduced. The flask was gradually warmed until the temperature reached about 100° C., then steam was introduced very slowly at first to prevent foaming, and finally more rapidly until no more oenanthol distilled over. The normal heptaldehyde was separated from the water in a separatory funnel and shaken for five or ten minutes with fused calcium chloride. The oenanthol was separated and distilled, the distillate collected between 150 and 155° C.



OXIDATION OF OENANTHOL TO OENANTHYLIC ACID.

The oenanthol was dissolved in about an equal quantity of acetone. To this solution was added about twice the theoretical amount of powdered potassium permanganate. The flask was kept cool with cold water in order not to allow the reaction to become too violent. When the manganese dioxide settled out, a pink color indicated that sufficient amount of potassium permanganate had been added. When the oxidation was complete the solution was rendered distinctly acid with dilute sulphuric acid and a saturated solution of sodium acid sulphite was added until the manganese dioxide and any excess potassium permanganate were dissolved. The solution was then practically colorless or a pale amber color.

PURIFICATION OF THE OENANTHYLIC ACID.

The solution resulting after the oxidation separated into two distinct layers; the upper layer containing the acetone solution of oenanthylic acid and the lower aqueous liquid containing potassium sulphate, manganese sulphate, and sodium bisulphate, etc. The liquid was then placed in a separatory funnel and the aqueous liquid drained off and discarded. Because of the miscibility of acetone with water in all proportions the oenanthylic acid was washed free from the ketone by shaking repeatedly with water and separating the lower layer. When the aqueous extract of the oenanthylic acid no longer smelled of acetone the oenanthylic acid was dissolved in about twice its volume of ether and shaken with a saturated aqueous solution of sodium carbonate until no more carbon dioxide was expelled. (Great care must be exercised if this is done in a separatory funnel.) The aqueous solution of the sodium salt of oenanthylic acid was extracted once with a 25-mil portion of ether. In this way any of the oenanthol which had not been oxidized will go in

solution in the ether, while the acid being present as its sodium salt remains in solution in the water. To the extracted aqueous solution was then added hydrochloric acid to a distinct acid reaction. The purified oenanthylic acid formed a distinct layer on the surface of the aqueous liquid.

$$2CH_3(CH_2)_5COOH + Na_2CO_3 \longrightarrow 2CH_3(CH_2)_5COONa + CO_2 + H_2O$$
$$2CH_3(CH_2)_5COONa + 2HCl \longrightarrow 2CH_3(CH_2)_5COOH + 2NaCl$$

ESTERIFICATION OF OENANTHYLIC ACID.

The esterification of the oenanthylic acid may be accomplished in one of several ways. The silver salt of oenanthylic acid may be made and this treated with ethyl iodide, under which condition ethyl oenanthylate results while silver iodide is precipitated. The method that was used in our laboratory was to dissolve the oenanthylic acid in about twice the theoretical quantity of absolute alcohol to which five mils of concentrated sulphuric acid were added and the mixture refluxed for about twelve hours.

$$CH_3(CH_2)_5COOH + C_2H_5OH \xrightarrow{(H_2SO_4)} CH_3(CH_2)_5COOC_2H_5 + H_2O \quad (H_2SO_4)$$

RECOVERY OF ETHYL OENANTHYLATE.

The alcoholic solution of ethyl oenanthylate was then poured into a quantity of water in order to separate the ethyl oenanthylate from the excess of alcohol present. This mixture was extracted with ether in which the ester is soluble, and the ether layer separated. The ether solution of ethyl oenanthylate was then washed with a very weak aqueous solution of sodium carbonate (not over two per cent.) in order to convert any unesterified oenanthylic acid to the water-soluble sodium salt. This was then separated and the ether layer washed with water. The ethyl oenanthylate was then treated with anhydrous sodium sulphate or fused potassium carbonate. (Fused calcium chloride should not be used.) The ether was then allowed to evaporate and the oenanthylic ethyl ester distilled.

The author acknowledges the assistance of Dr. Smith and Mr. Netz in this work.

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ANALYSES OF ONE HUNDRED PRESENT-DAY ALCOHOLIC BEVERAGES.*

BY HENRY KRAEMER.

In presenting a paper on this subject it is necessary to define one's attitude so that there be no misconstruction placed on the data which are given. Any article, letter, or questionnaire at this time on the subject of alcoholic beverages is to be viewed with suspicion as to its purposes and the influence which prompted it.

The Constitution of the United States as expressed in the 18th Amendment prohibits the manufacture and sale of intoxicating liquors. Respect for the law

* Read at the Scientific Section of the American Pharmaceutical Association, August 18, 1922, Cleveland, Ohio.

is the basis of American institutions. In his Farewell Address, George Washington said:

> "The basis of our political systems is the right of the people to make and alter their constitutions of government. But the constitution which at any time exists, till changed by an explicit and authentic act of the whole people, is sacred, obligatory upon all. The very idea of the power and the right of the people to establish government, pre-supposes the duty of every individual to obey the established government. All obstructions to the execution of the laws; all combinations and associations under whatever plausible character, with the real design to direct, control, counteract or awe, the regular deliberations and actions of the constituted authorities—are destructive of this fundamental principle, and of fatal tendency."

The offspring of the 18th Amendment, known as the Volstead Act to enforce prohibition, declares that liquors containing more than $^1/_2$ of 1 per cent. of alcohol are intoxicating. This standard is merely a construction for the purpose of law enforcement and was fixed by the brewers and distillers themselves. It was generally considered to be equitable and in the interest of public policy. The states have acted and many of them have gone further even than the Federal Law does. In at least five different states—Colorado, Michigan, Ohio, Oregon and Washington—the liquor interests have attempted to undermine the Volstead Act by submitting beer and wine referenda and in each instance their efforts were emphatically frustrated by the voters.

The natural impulse of the American people is right. Their judgments are on the side of kindness, helpfulness and even unselfishness. The 15th, 18th and 19th Amendments are some of the evidences of the progress of civilization and reveal the tests of a republican government and show the faith that the pioneers of this country had in their successors.

After the 18th Amendment had been in force for some time it seemed that the practical benefits of prohibition, which were apparent on every hand, would still forever the stills which had been the cause of the misery and crime of the ages.

During the first "dry" year New York had a surplus of nearly fifteen million dollars for financing the budget for 1921–1922, showing that the loss of liquor revenue had not bankrupted the state of New York. The compensation companies noticed quite a reduction in the number of Monday morning accidents after the national prohibition law went into effect. The number of inmates in work-houses and jails had been decreased and the institutions turned in many cases into schools and recreation buildings. Men were spending their time with their families at motion picture places and other places of amusement, instead of in drinking dens as formerly. The savings deposits showed an increase and it was estimated that prohibition would save the country more than six billion dollars a year. There was less want and suffering, more joy and happiness and it was estimated that 95 per cent. of the people endorsed, without reservation, national prohibition.

This 5 per cent., representing the law-breakers in our country, were not idle. They were marking time and were working with a certain class of the legal profession to see how they could get a wedge into the Volstead Act. Then we awakened to find that the saloon-less-ness of the country was somewhat fictitious. Our police courts were soon filled with a metropolitan crowd of drunks. The inebriates claimed that they were drinking home-brew beer or raisin whisky; as a matter of fact they were getting 4 and 5 per cent. beer and 35 to 45 per cent. whisky

in bond. Nearly all of this came from the outside, Canada shipping a large proportion of it.

In fact the business of running cargoes of rum across the border to the American side has assumed such colossal proportions that hundreds of people are devoting their entire time to the traffic and they are literally amassing fortunes. A round trip from the Canadian to the American side is worth $2500 clear to the operator of a big car and they are seen parked unmolested in front of the "soft drink parlors." The saloons are flourishing with their old-time vigor, only they are called soft drink parlors. A conservative estimate would be that there is not less than one "soft drink parlor saloon" to every thousand inhabitants and they are run with all their old associated evils and the situation is a really serious one. To-day 50 per cent. of the voters who may be counted upon as defenders of the republic do not seem to know what is going on. The other 50 per cent. are allied with lawlessness and tied either with chains of habit or the fear of the ridicule of the saloon element.

Well may we ask, what is the matter with America? The United States is a prohibition country and the great moral leader of the world. The 18th Amendment marks the greatest national moral adventure since Israel crossed from Egypt or the Pilgrims came to Plymouth. The Constitution declares that intoxicating liquors shall not be made or sold in this country which means that eventually they will not be. This tide of lawlessness must ultimately subside. The traffic at present is involved in the cost of living problem. I have been told with authority that 83 men have been counted in the course of an hour at the bar paying one dollar each for a drink of whisky, which in all probability contained wood alcohol.

The government derives no benefit from this sale of alcoholic beverages. The drinkers are not protected by law and they and their families must ultimately suffer the consequences. Lawlessness and crime are on the increase and the open violation of the prohibition law has made a mockery of the administration of justice. Winking at violations of the law by the voters, public officials and judges is a form of leprosy in our national life which eventually it will cost us a good deal to treat. In the meanwhile it is hazardous to ride in an automobile, it is unsafe to eat in a restaurant unless you know its character and it is unwise and unpatriotic to view with jest the apparent inability of our authorities to uphold and enforce the Prohibition Law.

About a year ago I received a request from the district attorney if I would make some examinations of the alcoholic beverages which were being sold. During this time we have examined a hundred or more representing probably all of the kinds which are generally sold. We have also testified in court and become familiar with the liquor situation as it is now being conducted and the character of the violators of the 18th Amendment. The beverages sold may be grouped into three classes.

1. Spirituous liquors.
2. Malt liquors.
3. Wines and fruity beverages.

Of one hundred beverages, 50 per cent. were malt liquors; 42 per cent. were whisky, and 8 per cent. were cider and wines. Of the last class 4 per cent. were wines and these were homemade and used on a very limited scale. There is ap-

parently no demand for wine and the evidence points to the fact that the introduction of the beer and wine amendment was merely an excuse to legalize the liquor traffic, in those states where this referendum were put to the votes of the people.

The spirituous liquors had an alcoholic content from 31 per cent. to 70 per cent. of alcohol. They included the old "white lion" which consisted of dilute alcohol and is now sold under the name "white mule." A year ago American whisky in bond could be purchased as well as some good Canadian whisky. There is little or no whisky in bond to be purchased on the market and an increasing amount of the whisky is a fictitious article. This was to be expected and is the history of fraud and adulteration wherever it has been practiced. Men who break the law are usually not content with exorbitant profits or considerate of the health of their customers. They will weaken their products and fortify them with substances which deceive or even poison their victims. There is no come-back and it is like the fruit peddler who comes before your door and moves on never to return but sells his products along the way to whomever may buy.

A very large quantity of the whisky sold to-day and even beer contains wood alcohol. The best test in our hands has been the Robinson Test, devised by Dr. William C. Robinson of the Department of Public Health of Philadelphia. He uses a potassium permanganate solution to oxidize the wood alcohol forming acetals, the latter splitting up into aldehydes, notably formaldehyde. This solution is then added to acidulated milk and gently heated until the mixture assumes a pink color. Formic aldehyde is the only aldehyde which restores the color of the permanganate and if wood alcohol is present the pink color is very pronounced and cannot be mistaken even when working with electric light. This test is so delicate that one may detect 0.01 per cent. of methyl alcohol. The test is carried out practically as follows:

1. Take 10 cc of the distillate which has been used in determining the alcoholic content and add 3 cc of a 3% potassium permanganate solution.
2. The solution is placed in a test-tube and heated on a water-bath at a temperature between 25 to 30° C., shaking the test-tube from time to time and allowing sufficient time for the complete reduction of the permanganate and the development of the aldehyde odors.
3. The solution is then filtered and usually a clear filtrate will be obtained. This should be colorless and it is usually advisable before filtering o add a few drops of hydrochloric acid in order to precipitate out any excess of potassium permanganate as a brown manganese hydroxide.
4. The filtrate then is poured into a porcelain casserole or evaporating dish and 10 cc each of the following added: distilled water, hydrochloric acid and fresh milk.
5. The mixture which is of a creamy whiteness is then gradually heated over a naked flame to the boiling point with constant agitation. If a bright permanent pink color develops wood alcohol is present and may be detected if only 0.01 per cent of wood alcohol is present in the suspected liquid.

Ordinarily a qualitative test is sufficient and a quantitative test is best made by using a Zeiss immersion refractometer. We have found, however, that it is possible to use this test for obtaining very accurate quantitative tests for the amount of wood alcohol present in alcoholic beverages. This is followed out by testing the smallest quantity of distillate which will give the reaction for wood alcohol.

If 1 cc of the distillate gives the reaction, then this quantity contains at least 0.01 cc of methyl alcohol. Then 100 cc contains 1 cc of methyl alcohol or is a

1 per cent. solution. The following table we use in making the calculation:

Amount of distillate giving reaction.	Amount of methyl alcohol in 100 cc or per cent.
0.5 cc	2 cc or per cent.
1.0 cc	1 cc or per cent.
2.0 cc	0.50 cc or per cent.
3.0 cc	0.33 cc or per cent.
4.0 cc	0.25 cc or per cent.
5.0 cc	0.20 cc or per cent.

In our examinations we have found as high as 11 per cent. of wood alcohol in a 45 per cent. whisky and 0.33 per cent. of wood alcohol in malt liquors averaging 4.5 per cent. of alcohol. One of the most interesting things brought out in this connection has been that the expert testers have been unable to detect any wood alcohol in any of the beverages in which it has been present. Detectives and Internal Revenue officers would sometimes leave the specimens saying, "That's liquor" and depart as though they were mighty glad to get rid of it. The combinations sold are so skilfully made that their exact composition cannot be easily determined and we may conclude that they are mixtures distilled from grain mash mixed with dried fruits, denatured alcohol containing wood alcohol, and in some cases pure whisky. The malt liquors consist of near-beers fortified with wood alcohol; even the Canadian beers which are said to contain 10 per cent. proof spirits come under this class.

It is unnecessary in this assembly to discuss the poisonous nature of wood alcohol. We generally recognize that it is the most deadly poison of daily commerce. Its use, however, in alcoholic beverages is growing and something should be done to protect those who are ignorant of its poisonous nature. Physicians and pharmacists might well engage in some coöperative work with the authorities having the enforcements of the law in their charge. In addition to prosecutions, severe punishments should be meted to unscrupulous dealers who are selling these poisonous mixtures. If someone puts poison in pies and there are some deaths, there is an immediate cry and a stampede. Wood alcohol is just as poisonous as arsenic, in fact more serious. A single teaspoonful of wood alcohol has been known to cause blindness and an ounce taken by a normal individual will produce death. Of course different individuals seem to be variously affected and sometimes there is an idiosyncracy that increases immunity. We know that wood alcohol is an insidious poison that eventually causes the loss of vision and death.

In some states the laws are such that the reporting of the presence of wood alcohol causes a good deal of trouble in the prosecution, the lawyers for the defendants contending that the beverage is medicated and hence does not come under the prohibition law. In the national prohibition act an intoxicating liquor is defined as one containing $^1/_2$ of 1 per cent. of alcohol and is fit for use for beverage purposes. However, under Title 2, Section 4, and paragraph 9 of this section, it is stated:

> Any person who shall knowingly sell any of the articles mentioned in paragraphs a, ...of this section for beverage purposes.....shall be subject to the penalties provided in Section 29 of this Title.

Paragraph "a" relates to denatured alcohol, which is alcohol containing a denaturing substance and wood alcohol would come in this class.

Near my home town it is estimated that 8000 gallons of 9 per cent. beer are exported daily. According to statements made by Charles Henry, the representative of the British-American Brewing Co., from $1500 to $2000 a day is being paid to the Dominion government in taxes on beer. This means that one of the border breweries is contributing upward of $500,000 a year to the Canadian treasury. Words fail me to express my opinion of a saloon nation. Suffice it to say that so long as Canada is a party to supplying this country with prohibited beverages and for the sake of profit engages in this nefarious traffic, there will be an agitation for a modification or even a repeal of the Volstead Act.

From my observations prohibition has come to stay. America may not be "dry" but she will be "dry" before there is any possibility of any change in the law. There is only one way to secure the repeal of any law, much less an amendment to the Constitution, and that is by the enforcement of the law. No matter where the agitation has taken place, there is every indication that all of the various states are standing pat on their previous position as to prohibition.

There is another wedge which the wet advocates are using to restore realcoholization. Inadvertently or with intent a good many physicians are using their profession to weaken the enforcement of prohibition and to engender and further a false agitation on the part of the masses for the repeal and modification of the Volstead Act. They are insisting that wines and beers and other alcoholic beverages are necessary medicinal agents. This contention is false and the action of the U. S. Navy leaves no room for doubt as to the proper procedure for all medical men and the course to be followed if alcohol is needed in medicine. The U. S. Navy has banned whisky absolutely, even for medicinal purposes. The obvious abuses of the requisitions after the prohibition law went into effect convinced the authorities that the only remedy was to eliminate alcohol entirely. Whisky is stricken from the supply table and when a medical officer deems alcoholic stimulation absolutely essential for the preservation of human life, the ethyl alcohol obtainable from supply officers may be prescribed and used in such vehicle as the individual cases demand.

It is not creditable to the medical profession that certain physicians are using the prescription privilege in such a way as to constitute a method of evading the prohibition law. When a physician issues 475 liquor permits in one day there is no question but that here is a deliberate abuse of the permit privilege.

It is to the credit of pharmacy that the majority are opposed to taking out liquor permits or having anything to do with the filling of prescriptions for alcoholic beverages. Wherever there have been violations of the prohibition law either through the sale of alcoholic beverages or medicinal preparations capable of being used as alcoholic beverages, boards of pharmacy have been prompt to act on the individual cases. There is no doubt but that the boards of pharmacy will enforce the prohibition law and coöperate with the federal authorities to stamp out any use of our profession in evading the law and in supplying alcoholic addicts.

It will be recalled that the American Medical Association distributed questionnaires to about 37 per cent. of the physicians of the United States. About 18 per cent. of the physicians regard whisky as a necessary therapeutic agent in the practice of medicine and less than 18 per cent. of the physicians had taken out prescription permits. There is no doubt but the majority of reputable medical

men view the use of alcohol in medicine very much as the U. S. Navy and would prefer to adopt a similar policy at the present time to protect the profession against the abuse of a certain class of practitioners. Furthermore, there can be no doubt that medical men in general are satisfied with the liquor permits permissible under the regulations of the Volstead Enforcement Act and are acting in good faith in using such permits. Supporters of the Volstead Act have no desire to curb the power given to medical men to issue prescriptions for alleged legitimate purposes under permits and if it becomes necessary to make more stringent regulations, the physicians have no one to blame but those in their own ranks who have abused this privilege. In the meanwhile the preponderance of evidence points to the fact that the best medical men condemn the prescription of whisky for patients and are not taking out permits for its use.

In conclusion we may say that the sobering of a nation is like the sobering of an individual. There may be relapses and back-sliding. Many hardly seem to realize the seriousness of the violation of the prohibition law. Regardless of what we feel, it is the law of the land and the violating of it is dangerous. It breeds a contempt not only for the enforcement of this law but also for other laws.

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THE IDENTIFICATION OF SOME LOCAL ANESTHETICS.*

BY L. E. WARREN.

During the last quarter of a century many organic substances have come into use in medicine because they possess the power of causing temporary loss of sensation when applied to the mucous surfaces, or by injection into the tissues. These substances are known as local anesthetics. Some are alkaloids occurring in nature, such as cocaine and tropacocaine, but most of them are synthetic bases whose physical and chemical properties resemble those of the naturally occurring alkaloids. The longest known of the local anesthetics is cocaine. Together with other bases this occurs in *Erythroxylon coca* and other species of *Erythroxylon*, shrubs, native to the Andean region of South America. Although cocaine was isolated in 1860[1] it was not until 1884[2] that its local anesthetic properties were sufficiently recognized to be made of practical value. Its use soon became widespread and for some years it remained the only known local anesthetic in practical use. However, cocaine was found to be distinctly poisonous, it produced undesirable side effects, such as mydriasis, cloudiness of the cornea and habit formation, and its salts were not stable in solution.

Tropacocaine was first found in coca leaves from Java.[3] It was found to be less poisonous than cocaine and to possess greater local anesthetic action,[4] without the objectionable mydriatic properties of cocaine. Further, the solutions of its salts were also less prone to decompose. It may be made synthetically by benzoylating pseudo-tropine.

Organic chemists, after working out the constitution of cocaine, attempted to build up a synthetic substitute for it which would be less toxic and perhaps cheaper. One of the first successful ones was α-eucaine.[5] This was found to be less toxic

* Scientific Section, A. Ph. A., Cleveland meeting, 1922.

than cocaine, cheaper and its solutions were stable on being heated. It had the disadvantage of causing pain and irritation when injected. Because of this it was superseded by β-eucaine, benzoyl-vinyl diacetone-alkamine hydrochloride.[6] This was found to be less toxic than α-eucaine. The salt of β-eucaine which is most used is the lactate because of its greater solubility than the hydrochloride.

After the advent of β-eucaine a great number of substances having local anesthetic properties were worked out by organic chemists. Many of them were more faulty than cocaine in their chemical and pharmacologic properties so that they never came into extensive use. Others were found to have some special advantages and their use became more or less general. Holocaine (phenacaine),[7] orthoform,[8] acoine,[9] nirvanin,[10] anesthesine (benzocaine),[11] alypin,[12] novocaine (procaine),[13] cycloform,[14] propaesin,[15] subcutin[16] and stovaine[17] came in quick succession. Apothesine[18] and butyn[19] were developed recently, while the anesthetic properties of saligenin[20] were only recently discovered although the substance had been known to plant chemists for many years.* Some of these have been widely used, each for some real or fancied advantage, and several have been dignified by admission into the pharmacopœias. Most of them have been described in "New and Nonofficial Remedies" at one time or another.

The synthetic local anesthetics resemble cocaine more or less in their structural relationships and they are, therefore, subject to about the same incompatibilities. In general they are precipitated by the usual alkaloidal reagents; consequently their separation in admixture is difficult. Fortunately they are rarely found together in medicine so that the analyst is usually required only to identify or determine but one at a time.

So far as the writer knows no systematic attempt has been reported heretofore to apply practically all of the commonly used alkaloidal reagents to all of the local anesthetics in common use. In these studies this has been done and the results tabulated for comparison. By this method some reactions have been observed which appear not to have been previously reported.

The literature on the chemical identification of local anesthetics is quite considerable, but is widely scattered. On that account no attempt is made here to review it systematically. The most comprehensive paper on the subject with which the writer is familiar is that by Hankin.[21] He recorded his observations on a large number of tests, and Saporetti[22] and Gadamer[23] are two others who have added much to the literature concerning tests for the local anesthetics. So far as practicable the work of these investigators has been repeated by the writer. In these studies but little attention has been paid to acoine, cycloform, α-eucaine, subcutin or nirvanin, substances which were not available because they are no longer used in medicine—at least not to any extent in this country.

Several of the local anesthetics are described in "New and Nonofficial Remedies." Several more that were formerly described in this work have been omitted because they were no longer available on the American market. Most of the observations recorded in this paper were made while preparing or revising the

* Recently benzyl alcohol and saligenin have been introduced as local anesthetics. Because of their relations to the alcohols they do not give many of the reactions for alkaloids. Benzyl alcohol is not included in these studies and but few tests were made on saligenin.

descriptions and tests for the identity and purity of the several substances for "New and Nonofficial Remedies."

The alkaloidal solutions used in this work unless otherwise stated were prepared by dissolving 1 Gm. of the substance in 50 cc of water, *i. e.*, they were approximately 2 per cent. in strength. Substances which were practically insoluble in water, such as benzocaine, orthoform and propaesin, were made soluble by suspending 1 Gm. in 50 cc of water and adding just sufficient hydrochloric acid with shaking to produce solution. Care was taken to avoid an excess of acid. The reagent solutions used, unless otherwise stated, were the test solutions described in the U. S. Pharmacopœia. The nonofficial test solutions were approximately 10 per cent. in strength.

The precipitation tests were made by adding a few drops of the reagent to about 1 cc of the alkaloidal solution with agitation. If no precipitate formed or if the precipitate at first formed had been dissolved, a few drops more of the reagent were added with further agitation. This was repeated until it became evident either that no precipitate would form, or that the one formed either was permanent or had been dissolved by an excess of the reagent. Since most alkaloidal precipitates are amorphous when first thrown down but may become crystalline on standing, about 10 minutes were allowed after the precipitation had taken place before recording the observation to determine whether or not the precipitate would become crystalline. In a few cases crystallization did not invariably begin within 10 minutes and a longer time was allowed. These exceptions are mentioned in the description of the test. The results obtained in over 400 tests are recorded in the tables.

By a comparison of the tabulated reactions it is possible to identify each of the substances studied. However, since there is such a large number of reactions to be compared a simplified scheme has been worked out to aid in the rapid identification of the substances in question. This consists first in applying the diazo-reaction by means of which the anesthetics are divided into two groups—*i. e.*, (1) those which respond to the reaction and (2) those which do not. The diazo group (A) includes benzocaine, butyn, orthoform, phenacaine, procaine and propaesin. The other group (B) includes alypin, apothesine, β-eucaine, cocaine, quinine and urea hydrochloride, stovaine and tropacocaine. The second step consists in testing the solutions with a list of seven reagents in succession. By tabulating the results obtained it is possible to identify any of the local anesthetics mentioned since no two give exactly parallel reactions. The findings for the entire series of tests are given in Table I, while Table II comprises the simplified scheme of identification. Some of the reactions require more explanation than can be given in the tables and these are given later in the form of comments. In addition to the precipitation tests several special tests were applied. For the sake of uniformity and completeness the results are included in the tables. These tests are given herewith:

Diazo Reaction.—To 5 cc of a 2 per cent. solution of the substance add 2 drops of diluted hydrochloric acid, 2 drops of 10 per cent. sodium nitrite solution and mix with a solution of 0.2 Gm. of β-naphthol in 10 cc of 10 per cent. sodium hydroxide solution. Certain of the local anesthetics give a deep red solution or scarlet precipitate.

Mercurous Chloride Test.—Mix intimately about 0.1 Gm. of the substance with 0.1 Gm.

of mercurous chloride and moisten the mixture with alcohol. With certain of the local anesthetics a darkening of the mixture takes place.

Sodium Hypochlorite Test.—To about 1 cc of the alkaloidal solution add a few drops of sodium hypochlorite solution. If a flesh-colored precipitate be given, add 2 cc of ether, shake the mixture and observe the color of the solvent. Several of the local anesthetics give precipitates more or less approaching to flesh-color and when shaken with ether the solvent is colored more or less approaching a burgundy red.

In addition to the results obtained by the experimental work considerable information concerning the physical properties of the local anesthetics was collected from the literature. As this kind of information is often of great value to the analyst it is included in the tables and comments. Specific credit cannot be given in each instance to the numerous workers whose results have been drawn upon for this collation.

Nearly all of the local anesthetics in solution give precipitates with potassium mercuric iodide solution, picric acid solution and phosphotungstic acid solution. These reagents, therefore, are of but little use in aiding in the differentiation between the several substances. Iodine is another reagent which gives precipitates with most of these substances. (The benzocaine precipitate with iodine solution is distinctive and this compound will be described later.) Certain other reagent solutions precipitate only a few of the substances; *e. g.*, tannic acid test solution precipitates only alypin and butyn; potassium sulphocyanate solution only butyn and phenacaine; potassium sodium tartrate only benzocaine, propaesin and quinine and urea hydrochloride.

Potassium permanganate solution is of considerable value in differentiating between the several substances. Apothesine, benzocaine, butyn, phenacaine, orthoform, and quinine and urea hydrochloride are reduced at once. Alypin, β-eucaine, cocaine, stovaine, and tropacocaine retain their color for some time. Cocaine precipitates with potassium permanganate, if the solution be not too dilute, in the form of violet crystals which occur in microscopically characteristic rhomboidal plates, often with an indentation at one corner. Alypin forms violet-red crystals but they are much less stable than the cocaine compound. Tropacocaine forms thick, short, violet-red prisms which are about as stable as the cocaine permanganate but which cannot be mistaken microscopically for that compound. The precipitates with β-eucaine and stovaine are amorphous.

Recently potassium citrate solution was suggested as an alkaloidal reagent by Toplis.[24] This has been applied to the local anesthetics and has proved useful. Benzocaine, butyn, orthoform, phenacaine, propaesin, quinine and urea hydrochloride and stovaine are precipitated. Some of the precipitates are crystalline as may be seen by consulting Table I.

Potassium iodide solution precipitates alypin, butyn, phenacaine, and tropacocaine. The character of the several precipitates is of importance and is described under the comments on the individual substances.

Potassium sodium tartrate produces white, crystalline precipitates with benzocaine, propaesin and quinine and urea hydrochloride.

The synthetic local anesthetics differ from cocaine and quinine and urea hydrochloride in being optically inactive. So far as the writer has been able to ascertain from the literature this rule holds good. All of the substances tested in these studies except the two mentioned were optically inactive. Since cocaine

has such pronounced optical properties it might be expected that tropacocaine might also be optically active, but such is not the case.

COMMENTS.

Alypin.—Alypin is benzoxy-2-dimethylamino-methyl-1-dimethylaminobutane. It is a white, crystalline powder; odorless; taste bitter; hygroscopic. Alypin is soluble in water, alcohol and chloroform; insoluble in ether. It melts at 169° C. Alypin gives a cream-white precipitate with tannic acid solution but the precipitate is soluble in excess of the reagent. Of the other substances tested only butyn behaved in a similar way. Alypin is distinguished from butyn by its failure to give the diazo-reaction. Alypin gives a white precipitate with potassium iodide. Butyn, phenacaine and tropacocaine react similarly. Alypin is distinguished from phenacaine and tropacocaine, however, by its failure to precipitate with sodium nitroprusside solution. It differs from benzocaine, butyn, orthoform, phenacaine, propaesin, quinine and urea hydrochloride and stovaine in not giving a precipitate with potasssium citrate. Alypin gives a violet, crystalline precipitate with potassium permanganate solution but the precipitate is not so stable as that with cocaine or tropacocaine.

Apothesine.—Apothesine is the hydrochloride of diethyl-amino-propyl cinnamate. It occurs in white, odorless masses which are composed of minute, colorless needles. It is soluble in water, alcohol and chloroform; insoluble in ether. Its taste is slightly bitter. It gives precipitates with potassium mercuric iodide solution, bromine water (soluble in hot water), sodium bicarbonate (soluble in excess), sodium borate, sodium salicylate, sodium nitroprusside, gold chloride (lemon-yellow), platinum chloride (yellow crystals) and palladium chloride (salmon). It is distinguished from other local anesthetics tested by the character of its precipitate with sodium nitroprusside. Of the others tested only butyn, phenacaine and tropacocaine give precipitates with this reagent. Of these butyn alone gives an amorphous precipitate which is yellowish-white in color and of a resin-like consistency. The apothesine precipitate is not resin-like and is of a salmon color. Butyn base and apothesine base are liquid; phenacaine base melts at 116–7° C., while tropacocaine base melts at 49° C. A color reaction for apothesine which appears to be characteristic is that with Marquis' reagent. About 0.01 Gm. of apothesine is treated with a few drops of sulphuric acid containing a trace of formaldehyde. The mixture is colorless at first but soon a pale brownish rose color develops which gradually changes to an intense mahogany brown. The isolated base responds to the test fully as well as the hydrochloride. It is believed that this reaction has not been described previously.

Benzocaine.—Benzocaine is ethyl amino-benzoate. It is a white, crystalline, odorless powder almost insoluble in water but soluble in very dilute hydrochloric acid. The most characteristic tests for benzocaine are with iodine test solution and mercuric chloride solution. With iodine solution benzocaine produces beautiful, iridescent crystals. The precipitate is slow to form and is aided by gentle shaking of the test-tube. In absence of confirmatory tests the precipitate might be mistaken for herepathite. With mercuric chloride test solution benzocaine forms beautiful, colorless needles on standing. This reaction takes place slowly and is best observed after the mixed solutions have stood for 30 minutes. Of the other substances tested several (cocaine, quinine and urea, and tropacocaine) gave white, crystalline precipitates with mercuric chloride but none gave such long, slender needles as were obtained with benzocaine. It is believed that this reaction has not been described previously. Benzocaine gives the diazo-reaction but this does not distinguish it from butyn, orthoform, phenacaine, procaine or propaesin, each of which responds to the test. However, three of these substances may be distinguished from benzocaine by the physical properties of their separated bases. Butyn base is liquid at ordinary temperatures, procaine base melts at about 58 to 60° C. and phenacaine base at 116 to 117° C. The melting point of benzocaine is 90 to 91° C., and that of propaesin 73° C. Propaesin is not precipitated by mercuric chloride. Orthoform is not precipitated by potassium sodium tartrate (as is benzocaine). Quinine and urea hydrochloride is precipitated by potassium sodium tartrate (as well as benzocaine) but this substance is readily distinguished from benzocaine by its failure to give the diazo-reaction and by its strong fluorescence in very dilute sulphuric acid. Benzocaine does not darken with mercurous chloride and alcohol (difference from alypin, apothesine, cocaine, procaine, quinine and urea hydrochloride, stovaine and tropacocaine).

Cocaine Hydrochloride.—Cocaine hydrochloride, methyl benzoyl ecgonine hydrochloride,

is official in the U. S. Pharmacopœia. It occurs in white, crystalline masses; odorless; permanent in the air. It is soluble in water, alcohol and chloroform; insoluble in ether. Cocaine hydrochloride is precipitated by mercuric chloride, sodium carbonate, sodium bicarbonate, potassium permanganate and Fehling's solution. It is darkened by mercurous chloride and alcohol (*difference from β-eucaine*). Its precipitate with potassium permanganate occurs in violet, rhomboidal plates which frequently have an indentation at one corner and which are more stable than the permanganates of the other local anesthetics. It is distinguished from alypin by its failure to precipitate with potassium iodide, tannic acid solution or sodium borate; from benzocaine by its failure to precipitate with potassium bismuth iodide or potassium sodium tartrate or to give the diazo-reaction; and by its precipitation with potassium cadmium iodide and by its positive reaction with mercurous chloride and alcohol; from β-eucaine by its precipitation with sodium bicarbonate and mercuric chloride and by its positive reaction with mercurous chloride and alcohol; from apothesine by its failure to precipitate with sodium salicylate, sodium nitroprusside, sodium borate or potassium ferricyanide; from phenacaine by its failure to precipitate with potassium iodide, sodium nitroprusside, potassium citrate, sodium borate or potassium sulphocyanate; from butyn by its failure to precipitate with potassium iodide, sodium salicylate, sodium nitroprusside, tannic acid, potassium citrate, sodium borate or potassium sulphocyanate; from orthoform by its precipitation with potassium mercuric iodide, picric acid, sodium carbonate and potassium cadmium iodide and by its failure to precipitate with potassium citrate or to give the diazo-reaction. Further, it does not reduce chromic acid, potassium permanganate or gold chloride as does orthoform. Cocaine is distinguished from procaine by its precipitation with sodium bicarbonate or chromic acid (after adding hydrochloric acid), by its failure to give the diazo-reaction or to reduce potassium permanganate immediately; from quinine and urea hydrochloride by its failure to precipitate with sodium salicylate, potassium citrate, potassium ferricyanide or sodium borate; from propaesin by its precipitation with mercuric chloride, chromic acid (after adding hydrochloric acid), potassium cadmium iodide or sodium borate and by its failure to precipitate with potassium tartrate, potassium citrate or sodium borate; from stovaine by its precipitation with chromic acid (after the addition of hydrochloric acid) and by its failure to precipitate with potassium citrate or sodium borate; and from tropacocaine by its failure to precipitate with potassium iodide, sodium nitroprusside, potassium bismuth iodide, sodium borate or potassium ferricyanide, and by its precipitation with sodium bicarbonate.

β-Eucaine Lactate.—β-Eucaine is trimethyl-benzoyl-oxy-piperidine. It is official in the U. S. Pharmacopœia in the form of its chloride. β-Eucaine lactate is a white, crystalline powder; odorless; permanent in the air. It is soluble in water, alcohol and chloroform, but only slightly soluble in ether. β-Eucaine lactate is precipitated by sodium salicylate, bromine water, chromic acid, gold chloride and Fehling's solution. It is distinguished from cocaine by its failure to precipitate with mercuric chloride and sodium bicarbonate, by its precipitation with sodium salicylate, by its optical inactivity, and by the fact that it does not darken with the mercurous chloride and alcohol test; from phenacaine by its failure to precipitate with mercuric chloride, sodium bicarbonate, sodium nitroprusside, potassium iodide, potassium citrate, sodium borate, and potassium ferricyanide; from procaine by its failure to precipitate with mercuric chloride or to give the diazo-reaction and by its precipitation with chromic acid and sodium salicylate. β-Eucaine is distinguished from stovaine by its precipitation with chromic acid, sodium salicylate and potassium dichromate and by its failure to precipitate with mercuric chloride, sodium bicarbonate or potassium citrate; from tropacocaine by its failure to precipitate with potassium iodide, mercuric chloride, sodium nitroprusside, sodium borate or potassium ferricyanide.

Butyn.—This is *p*-aminobenzoyl-γ-dinormalbutylaminopropanol sulphate. It is a white, hygroscopic solid; very soluble in water; soluble in alcohol and chloroform; insoluble in ether. Butyn gives a white, curdy precipitate with potassium iodide solution. Of the other substances tested alypin, phenacaine and tropacocaine only give precipitates with this reagent. The alypin precipitate is crystalline, the tropacocaine precipitate is in the form of glistening white scales and the phenacaine precipitate does not form curds. Consequently this test is, in a sense, distinctive for butyn. Attempts to determine butyn by collecting the butyn-iodide compound and weighing it were not satisfactory. This is due to the fact that the precipitate is appreciably soluble in water. Butyn gives white, amorphous precipitates with potassium sulphocyanate, potassium citrate and mercuric chloride solutions. It gives crystalline precipitates with chromic

TABLE I.—REACTIONS OF SOME LOCAL ANESTHETICS.

Reagent.	Alypin.	Benzocaine (anesthesine).	Apothesine.	β-Eucaine lactate.	Butyn.	Cocaine hydrochloride.	Phenacaine (holocaine hydrochloride).	Orthoform.	Procaine.	Quinine and urea hydrochloride.	Stovaine.	Tropacocaine-hydrochloride.	Propaesin.
Iodine and potassium iodide	Brown	Brown iridescent crystals	Red-brown	Brown precipitate; sol. on boiling	Drab	Brown	Brown	Brown; slow to form; then reduction	Brown	Brown	Brown	Brown	Brown
Potassium mercuric iodide	White; curdy	....	White	White	White	White	White; curdy	....	White	White	White to cream	White	White
Potassium iodide	White; cryst.	....	....	....	White; curdy	....	White	....	....	....	....	White glistening scales	....
Mercuric chloride	White; amorphous	Beautiful colorless needles on standing	White; amorphous	....	White; amorphous	White; cryst.	White	....	White; sol. in hot water	White; cryst.	White; sol. in excess	White; bulky; cryst.	....
Phosphotungstic acid	White	White	White	White	White	White	White	White	White	White	White	White	White
Picric acid	Yellow; masses; minute prisms	Yellow	Yellow; cryst.	Yellow; cryst.	Yellow; cryst.	Yellow; long needles	Yellow; cryst.	.... cryst.	Yellowish masses of needle-like prisms	Yellow	Yellow; cryst.	Yellow; minute needles	Yellow
Sodium carbonate	White	White; cryst.	White	White	White	White	White	....	White	White	White	White; amorphous	White
Sodium bicarbonate	....	White; soluble in excess	White; soluble in excess	....	White	White; colorless; slender needles	White	White; cryst.	....	White	White	....	White
Gold chloride	Pale lemon-yellow; cryst.	Brown	Lemon-yellow	Lemon-yellow	Brown	Pale lemon-yellow; like fern fronds	Canary-yellow	Dirty, dark green	Brown	Orange-yellow	Yellow; cryst.	Yellow; pinnate prisms	Yellowish brown
Platinum chloride + HCl	Salmon; aggregate of minute prisms	Pale yellow; cryst.	Yellow; cryst	Crystalline needles	Pale orange, amorphous	Yellow plumose needles	Drab	....	Yellow	Pale yellow	....	Pale salmon; cryst.	Yellow; cryst.
Palladium chloride	Salmon	Yellowish white; gelatinous	Salmon	....	Yellowish brown	....	Salmon	Pale yellow cryst.	Brownish orange	Salmon	....	Salmon; fern-like cryst.	Salmon, flocculent
Chromic acid	....	....	Orange	Yellow large crystals	Orange-yellow cryst.	Add HCl; orange; cryst.	Orange-yellow	Blackens instantly	....	Orange	....	Yellow; fern-like	....
Bromine water	Yellow; sol. in hot water; reappears on cooling	White; partly soluble in hot water	Yellow; sol. in hot water	Pale yellow; sol. on heating	White	Yellow; sol. on heating	Yellowish brown; sol. on heating	Yellowish green; orange on boiling	Yellow; sol. in hot water	Yellow; sol. in hot water	Orange	Yellow; sol. on heating	White

Potassium cadmium iodide	White	....	White	White	White	White	White	....	Drab	Cream	White	White; cryst.; very bulky	....
Potassium zinc iodide	....	....	Pale yellow; beautiful needles	....	White	Pale yellow	Yellowish white	....	....	....	Yellow cloud	White; cryst.; bulky	....
Sodium salicylate	....	White	White; amorphous	White; cryst.	White	....	White	....	....	Cream-white	....	....	White; cryst.
Sodium nitroprusside	....	....	Pale salmon; amorphous	....	Yellowish white; resin-like	....	Pale salmon; cryst.	....	....	....	....	Colorless; cryst.	....
Fehling's solution	White	White; cryst.	White	White	White	White; large prisms	White	Green; sol. in excess	White	White; curdy	White	White	White; cryst.
Potassium sodium tartrate	....	White; cryst.	....	....	....	....	....	....	....	White; cryst.	....	....	White; cryst.
Sodium hypochlorite	White	Flesh-colored precipitate	Cream-white; curdy	White	Flesh-colored; cryst.	White; amorphous	Flesh-colored; becoming violet	Grayish brown	Flesh-colored	Cream-white; curdy; becoming cryst.	White; amorphous	White; cryst.	Flesh-colored
Potassium dichromate	Orange; cryst.	Darkens on standing	Yellow precipitate	Orange	Orange-yellow	Orange-red	Yellow	Black; reduces instantly	....	Orange	....	Orange-red; cryst.	....
Potassium permanganate	Violet; cryst. soon decomp.	Decomposes instantly	Decolorizes at once	Does not decomp. at once	Decomposes instantly	Violet minute cryst.	Reduces at once	Reduces at once	Decomposes immediately	Reduces instantly	Reduces slowly	Violet; cryst.	Reduces instantly
Tannic acid	Cream-white; sol. in excess	....	....	....	Cream-white; curdy; sol. in excess	....	....	....	....	....	....	....	....
Potassium citrate	....	White; cryst.	....	....	White; amorphous	....	White; amorphous	White; cryst.	....	White; cryst.	White; amorphous	....	White; cryst.
Potassium chromate	Yellow; cryst.; slow to form	Orange; cryst.	Greenish yellow cloud	....	Orange-yellow; cryst.; reduces on standing	Add HCl; orange precipitate	Yellow	Black; reduces instantly	....	Yellow; cryst.	Yellow	....	Orange; cryst.
Potassium bismuth iodide	White	Orange; cryst.	Orange	....	White cryst.	....	Orange	....	....	Orange	....	Bulky white; cryst.	Orange
Sodium borate	White	White; cryst.	White	....	White	....	White	....	....	White	White	White; amorphous	White; cryst.
Potassium ferricyanide	....	....	Lemon-yellow; oily	....	Brownish yellow oil	....	Brownish yellow	....	....	Pale yellow; sol. in excess	....	Needle-like; cryst.	....
Mercurous chloride	Darkens	No change	Darkens	No change	No change	Blackens	No change	No change	Blackens	Darkens	Darkens	Darkens	No change
Diazo-reaction	White precip.; dissolves on standing	Dark ruby-red color	White precip. dissolves on standing	White precip. soon dissolves	Red	White precip. soon dissolves	Scarlet	Dark red color	Scarlet precipitate	White; dissolves on standing	No color	Yellow	Scarlet
Potassium sulphocyanate	....	....	....	....	White; amorphous	....	White rosettes	....	....	....	....	....	....

acid, potassium zinc iodide, sodium hypochlorite and potassium dichromate solutions. Since butyn is a sulphate it gives a precipitate with barium chloride solution thus differing from other local anesthetics in common use. Butyn is distinguished from alypin by its precipitation with sodium bicarbonate, from apothesine by its precipitation with potassium iodide, potassium citrate, sodium borate, potassium ferricyanide, and potassium sulphocyanate; from cocaine by its precipitation with sodium nitroprusside, potassium citrate and sodium borate; from phenacaine by its precipitation with tannic acid; from orthoform by its precipitation with potassium iodide, picric acid and mercuric chloride; from procaine by its precipitation with potassium iodide, sodium bicarbonate and sodium nitroprusside, and from stovaine by its precipitation with potassium iodide and sodium salicylate.

Orthoform.—Orthoform is *m*-amino-*p*-hydroxy benzoate. It is a white, odorless powder; almost insoluble in water, but soluble in dilute hydrochloric acid. Its insolubility in water distinguishes it from the other local anesthetics tested except benzocaine and propaesin. It is soluble in ether, thus differing from most of the other local anesthetics, except benzocaine and propaesin. No precipitate is given with picric acid. This distinguishes it from most other local anesthetics except saligenin. It is not precipitated by potassium mercuric iodide. It reduces chromic acid instantly; also potassium chromate and potassium dichromate, thus differing from all of the other substances tested. It gives a white, crystalline precipitate with potassium citrate. It gives the diazo-reaction, forming an intensely dark red solution. Orthoform (solid) gives an intensely black color with nitric acid which gradually changes to a rich, mahogany brown. Under the same conditions saligenin gives a yellowish brown color and phenacaine slowly becomes brown, but none other of the substances tested gave reactions at all simulating the reaction with orthoform. Orthoform reduces potassium permanganate instantly but it does not darken with mercurous chloride and alcohol.

Phenacaine.—Phenaciane is ethenyl-*p*-diethoxy-diphenyl amidine hydrochloride. It is soluble in about 50 parts of water; soluble in alcohol and chloroform; insoluble in ether. Phenacaine is precipitated by potassium sulphocyanate in the form of white rosettes, a reaction which is distinctive and which appears not to have been noted previously. It also gives precipitates with potassium iodide, sodium nitroprusside, potassium citrate and mercuric chloride. Phenacaine is distinguished from the other members of the diazo-group of local anesthetics by its failure to precipitate with potassium sodium tartrate. None of the members of the non-diazo-group are precipitated by potassium sulphocyanate, and only quinine and urea hydrochloride with potassium sodium tartrate. Phenacaine is precipitated by a larger number of reagents than is any other of the synthetic anesthetics tested.

Procaine.—Procaine is *p*-amino-benzoyldiethylamino-ethanol hydrochloride. It is a white, odorless, crystalline powder; soluble in water, alcohol and chloroform; insoluble in ether. Procaine gives the diazo-reaction and a white precipitate with mercuric chloride solution which is soluble in hot water. It is not precipitated by potassium citrate solution which distinguishes it from the other alkaloids of the diazo-group. It is not precipitated by sodium bicarbonate, chromic acid, sodium salicylate or potassium dichromate. It gives a brown precipitate with gold chloride solution. It reduces potassium permanganate instantly.

Propaesin.—Propaesin is propyl-amino-benzoate. It occurs as a fine, white, odorless powder; permanent in the air. It is soluble in alcohol, ether and chloroform, but only slightly soluble in water. It is distinguished from alypin, butyn, phenacaine and tropacocaine by its failure to precipitate with potassium iodide; from benzocaine and quinine and urea hydrochloride by its failure to precipitate with mercuric chloride; from apothesine and butyn by its failure to precipitate with chromic acid; from β-eucaine by its failure to precipitate with sodium salicylate; and from cocaine by its failure to precipitate with potassium cadmium iodide.

Quinine and Urea Hydrochloride.—Quinine possesses distinct local anesthetic properties but many of its salts are too scantily soluble to be of good service in this field. By mixture with urea hydrochloride the quinine salts become much more soluble. A mixture of equimolecular proportions of quinine hydrochloride and urea hydrochloride is very soluble in water and, before the advent of so many synthetic local anesthetics, this preparation had some vogue as a local anesthetic. Quinine and urea hydrochloride occurs as a white, granular powder or in colorless, translucent prisms; odorless; taste bitter; soluble in water, alcohol and chloroform; insoluble in ether. Quinine and urea hydrochloride precipitates with potassium ferricyanide but not with

sodium nitroprusside, thus distinguishing this substance from apothesine, butyn and phenacaine which give precipitates with both reagents. Quinine and urea hydrochloride is distinguished from all of the other substances tested by its strong fluorescence when dissolved in very dilute sulphuric acid. It is optically active, the specific rotation being about $-173.7°$ in water at 21° C. It is distinguished from alypin by its failure to precipitate with potassium iodide or tannic acid; from apothesine by its failure to precipitate with sodium nitroprusside; from benzocaine by its precipitation with potassium ferricyanide and potassium mercuric iodide; from β-eucaine by its precipitation with potassium sodium tartrate, potassium citrate, sodium bicarbonate and sodium borate; from cocaine by its precipitation with potassium sodium tartrate, potassium citrate and sodium borate; from phenacaine by its failure to precipitate with potassium iodide; from procaine by its precipitation with sodium bicarbonate, potassium sodium tartrate and potassium citrate; from propaesin by its precipitation with mercuric chloride; from orthoform by its precipitation with picric acid; from stovaine by its precipitation with palladium chloride and potassium ferricyanide; and from tropacocaine by its failure to precipitate with potassium iodide and sodium nitroprusside.

TABLE II.—REACTIONS FOR THE RAPID IDENTIFICATION OF LOCAL ANESTHETICS.

	Synthetic.	Potassium sulphocyanate.	Potassium iodide.	Sodium nitroprusside.	Potassium sodium tartrate.	Potassium citrate.	Potassium permanganate.	Mercuric chloride.
A Diazo-Group	Benzocaine	....	....	....	White; cryst.	White; cryst.	Decomposes instantly	Beautiful, colorless needles (Form slowly)
	Butyn	White; amorphous	White	Yellowish white; resin-like	....	White; amorphous	Decomposes instantly	White; amorphous
	Orthoform	....	....	....	....	White; cryst.	Reduces instantly	....
	Phenacaine	White; rosettes	White	Pale salmon; cryst.	....	White; amorphous	Reduces instantly	White
	Procaine	....	....	....	....	....	Decomposes instantly	White; soluble in hot water
	Propaesin	....	....	....	White; cryst.	White; cryst.	Decomposes instantly	....
	Alypin	....	White; cryst.	....	....	....	Violet; cryst.; not very stable	White; amorphous
	Apothesine	.....	....	Pale salmon	....	....	Decomposes instantly	White; amorphous
B [Non-Diazo-Group	β-Eucaine	....	....	....	....	....	Not decomposed at once	....
	Cocaine	....	....	....	....	....	Violet; cryst.; quite stable	White; cryst.
	Quinine and urea hydrochloride	....	....	....	White; cryst.	White; cryst.	Decomposes instantly	White; cryst.
	Stovaine	....	....	....	....	White; amorphous	Decomposes slowly	White; soluble in excess
	Tropacocaine	....	White; glistening scales	Colorless; cryst.	....	....	Violet; thick prisms	White; bulky; cryst.

Saligenin.—Saligenin is *o*-hydroxy-benzyl alcohol. It is not precipitated by any of the ordinary alkaloidal precipitants except bromine water. With this reagent it forms pale yellowish white crystals. Since saligenin is a phenolmethylol it is probable that it might be estimated by adding an excess of bromine solution and titrating the excess as is done with phenols. It slowly reduces gold chloride and instantly reduces potassium permanganate. It is optically inactive. Saligenin (solid) is instantly colored rose-red by concentrated sulphuric acid. None of the other local anesthetics tested gave this reaction. Saligenin (solid) with ferric chloride solution gives a grass-green color which is persistent.

Stovaine.—Stovaine is ethyl-dimethylamino-benzoyl-pentanol hydrochloride. Stovaine occurs as a white, crystalline, odorless powder; soluble in water, alcohol and chloroform, but insoluble in ether. Stovaine is precipitated by mercuric chloride (soluble in excess), Fehling's solution, potassium citrate and sodium borate. It is not precipitated by sodium salicylate, sodium nitroprusside or potassium sodium tartrate. Stovaine is distinguished from alypin, butyn, phenacaine and tropacocaine by its failure to precipitate with potassium iodide; from benzocaine by its failure to precipitate with palladium chloride; from apothesine and β-eucaine by its failure to precipitate with sodium salicylate; and from cocaine and quinine and urea hydrochloride by its failure to precipitate with platinum chloride. It is distinguished from orthoform by its precipitation with potassium mercuric iodide; from procaine by its precipitation with sodium bicarbonate; and from propaesin by its precipitation with mercuric chloride.

Tropacocaine.—Tropacocaine hydrochloride is distinguished from cocaine hydrochloride in being optically inactive and in giving crystalline precipitates with potassium ferricyanide, sodium nitroprusside and potassium iodide. The last mentioned precipitate occurs in glistening white scales unlike the iodide of any other local anesthetic tested. The ferricyanide and nitroprusside tests also distinguish it from alypin, benzocaine, orthoform, procaine, propaesin, saligenin and stovaine. Apothesine, butyn and phenacaine give precipitates with both these reagents; butyn and phenacaine give precipitates with potassium citrate and potassium sulphocyanate (which tropacocaine does not do) and apothesine is not precipitated by potassium iodide as is tropacocaine. Further, tropacocaine differs from cocaine in the crystalline form of its permanganate as has been noted under cocaine.

TABLE III.—PHYSICAL PROPERTIES OF THE LOCAL ANESTHETICS.

Anesthetic.	Solubility in water.	Solubility in alcohol.	Solubility in chloroform.	Solubility in ether.	Melting point.	Melting point of base.
Alypin	Soluble	Soluble	Soluble	Insoluble	169°	Liquid
Apothesine	Soluble	Soluble	Soluble	Insoluble	137°	Liquid at room temperature
Benzocaine	Slightly soluble	Soluble	Soluble	Soluble	90–91°	90–91°
β-Eucaine lactate	Soluble	Soluble	Soluble	Slightly soluble	152° 155°	91°
Butyn	Soluble	Soluble	Slowly soluble	Insoluble	98–100°	Liquid
Cocaine hydrochloride	Soluble	Soluble	Soluble	Insoluble	183–191°	96–98°
Orthoform	Nearly insoluble	Soluble	Slightly soluble	Soluble	141–143°	....
Phenacaine	Soluble	Soluble	Soluble	Insoluble	189°	116–117°
Procaine	Soluble	Soluble	Soluble	Insoluble	153–155°	58–60°
Propaesin	Almost insoluble	Soluble	Soluble	Soluble	73°	....
Quinine and urea hydrochloride	Soluble	Soluble	Soluble	Insoluble	....	....
Stovaine	Soluble	Soluble	Soluble	Insoluble	175–176°	Liquid
Tropacocaine Hydrochloride	Soluble	Soluble	Soluble	Insoluble	271–276° decomposes	49°

SUMMARY.

The usual alkaloidal reagents have been applied to 2 per cent. solutions of alypin, apothesine, benzocaine, β-eucaine, butyn, cocaine hydrochloride orthoform, phenacaine, procaine, propaesin, quinine and urea hydrochloride, stovaine, and tropacocaine hydrochloride. Observations on the optical activity of the substances studied were also made and a few color reactions were included. In a total of over 400 tests several reactions were observed which it is believed have not been reported previously. Several of these reactions are of particular value in the identification of the substances. A method for the rapid identification of certain local anesthetics has been worked out. This consists in first applying the diazo-reaction by which the substances are separated into two groups. This is followed by treating separate portions of the unknown solution, respectively, with potassium sulphocyanate, potassium iodide, sodium nitroprusside, potassium sodium tartrate, potassium citrate, potassium permanganate and mercuric chloride. In these tests no two of the substances studied give parallel reactions.

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APPARATUS AND MANIPULATIONS.

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Micromethod for the determination of ethyl alcohol in blood

Biochem. Ztschr., 131 (1922), 473; through *Chem. Zentralbl.*, 94 (April 25, 1923), part 2, 987

THE FIELD OF THE HOSPITAL PHARMACY.*

BY HOMER F. SANGER.[1]

The president of your Chicago Branch of the American Pharmaceutical Association asked me to give you a brief survey of hospitals of the United States as a background for the study of the hospital pharmacy.

The latest survey of hospitals by the American Medical Association lists a total of 7178 hospitals of which 6580 are in the United States proper, 203 are in the dependencies and 395 in Canada and Newfoundland. This does not include homes for the aged, homes and schools for the blind and deaf, and other institutions for custodial care, which are sometimes mistakenly enumerated with hospitals.

The unit for counting the capacity of hospitals is the bed, and there are in the United States approximately 750,000 beds. Hospitals vary greatly as to size, ranging anywhere from a few beds grouped around a doctor's office and operating room, up to 5000 or 6000 beds. About 3000 hospitals have 25 beds or more.

* Read before Chicago Branch, A. Ph. A. April 6, 1923.

[1] Council on Medical Education and Hospitals of the American Medical Association.

Approximately 67 per cent. of the beds are occupied every day, which means that there are about one-half a million sick persons in hospitals of the United States all the time.

The supply of 750,000 hospital beds gives about one bed to every 150 people. This supply of hospital beds is not quite ample to meet the demands. More hospital beds are needed because of a lack of even distribution of beds. Perhaps there is a slight over-supply in some localities, and there certainly is an under-supply in other localities. Also during times of epidemic, or when there is a great deal of sickness, hospitals are overtaxed, while at normal times they may run below capacity. Not only are additional hospital facilities needed to take care of the increase in population, but there is also a vast increase in the use of hospitals, because of the better care of patients and greater convenience to doctors in hospitals.

Since the close of the World War, there has been remarkable expansion in the building of hospitals. It is fairly estimated that $350,000,000 go into buildings and permanent equipment for hospitals annually. About $550,000,000 are being spent each year by the hospitals for maintenance and expenses that do not come under the head of permanent improvement. But the end of this hospital expansion is not yet, for a great many building projects are ready to begin building as soon as prices and conditions in the building trade become favorable.

If there is at present a striking increase in the amount of hospital service, there is just as striking a demand for better hospital service. The War, with its strict examinations and its severe strain on all of our resources, revealed the weaknesses in many parts of our civilization, particularly in the health of the people, and it pointed out weak spots in the machinery of health. We have been finding out where the weak spots are in our hospitals, and where improvements can be made.

The various organizations having to do with hospitals, have each put on some program for the improvement of the department of the hospital with which the particular organization was especially concerned. For example, the American Hospital Association, an organization of hospitals and hospital superintendents, has studied the subject of sterilization of hospital supplies and laid down standard rules. It has also made extensive studies and adopted standards for record and accounting forms for hospitals, the flooring of hospitals, the social service department and the hospital laundry. At the present time, other departments of hospitals are being made the subject of comprehensive study with a view to recommending uniform standards.

As another example of standardization in hospitals, the American College of Surgeons has for several years been inspecting all the hospitals of the country down to fifty beds' capacity, and instituting definite programs for the improvement of the laboratory, the records and the staff organization, and a uniform rule forbidding the division of fees by physicians practicing in the hospital.

The American Medical Association through its Council on Medical Education and Hospitals, always in close touch with hospitals, made a special study of hospital interneships for medical graduates, and in 1914 published its schedule of Essentials in a Hospital for Interne Training, which is now generally accepted. The Council has applied its standards to more than 1200 hospitals that have applied for approval, 652 of which are on the list of hospitals approved for interne training.

Still other agencies are working to improve hospital services. A few State legislatures have appointed commissions who are bringing the hospitals of those States up to certain standards and sometimes they require a hospital to reach a certain standard of excellence before it can receive State appropriation. The National League of Nursing Education and the American Medical Association are working together in a movement which will doubtless result in the enforcement of some standard for the training of nurses. Dietetics has come for its share of attention—and what about the standardizing of the hospital pharmacy? It is my impression that this important department has not yet been given the same study nor subjected to the same degree of standardization that other departments of the hospital have. The hospital pharmacist, because of his close relationship to the medical staff and other professional people of the hospital, is placed in a position that is different from that of a manager or owner of a drug store. Hospital pharmacy is necessarily a matter of service and not of salesmanship. When will the hospital pharmacy be thoroughly studied and established on a uniform basis of excellence, and who is going to do it?

Some of the other departments of the hospitals are being standardized from within, that is, these departments are being placed on a uniform, efficient basis by the hospitals themselves; for example, the work of all the committees of the American Hospital Association, which is an association of hospitals and of hospital administrators.

Other departments of hospital service are being standardized from without, that is, agencies outside of the hospital, or the hospital organization, are coming in and by common consent inducing the necessary improvements. Presumably, the work of improving a department will not come from without if the hospitals will accomplish it of their own volition.

Now there are certain things that always accompany the standardization, or shall we say uniform improvement, of any department or service of a hospital. First of all, a thorough survey is instituted which locates the high spots as well as the weak spots in the present system. It educates the department that is under survey to its opportunity for more efficient service. Then it results in the recommendation of a uniform standard, or a universal program of improvement. This means a great deal; among other things it means (*a*) adequate equipment, (*b*) efficient routine, (*c*) higher standards of education for those who have charge of the department, (*d*) a standard of ethics that is in keeping with the best ideals of hospitals and of the medical profession.

I think it is perfectly obvious that any program of improvement, if it deserves to be called standardization, is a great deal more than simply the formation of a trade union; it is a program to fit the services to the needs of all parties concerned, and when standards are adopted they should be broad and comprehensive and numerous enough to take in the best interests of the patient, and the other departments of the hospital, including the medical staff, in order that there might be the greatest possible efficiency in the relief and healing of the sick and injured, which after all is the object of hospitals themselves and, therefore, the desire of all who are connected with hospitals in whatever department.

THE RELATION OF THE HOSPITAL PHARMACIST TO THE MEDICAL AND ADMINISTRATIVE CORPS.*

BY E. T. OLSEN, PH.G., M.D.[1]

In presenting this subject I do so with mingled feelings of regret and pleasure. Regret at being out of the active field of the practice of pharmacy, and pleasure at being permitted again, on practically the 25th anniversary of my receiving the degree of Ph.G. from the old Chicago College of Pharmacy, to associate intimately, if only for an evening, with my former teachers, classmates and fellows in pharmacy.

This subject is so broad and it presents so many aspects and conditions of interest for discussion, that I apologize for inevitable digressions from the strict path of my topic. In order to convey a better understanding of the situation generally, the following statements relative to hospitals and hospital administration are made.

Primarily the hospital is a business institution, and "Hospital Business" is "big business." Our hospital with only 150 beds represents an investment of about half a million dollars, and our expenditures last year were about $150,000.

Most hospitals are charitable institutions and are not conducted for profit in the sense that individuals or groups of individuals derive pecuniary benefit, in the form of cash or stock dividends, from their operation. Unlike any other business they operate with the advance knowledge that a greater or less percentage of their "production" will be given away to unknown "customers" every year.

The only function of a hospital is "the care of the sick" and all of our activities center around this one purpose. To properly care for the sick requires the coordination of many activities, each of which must be under constant competent supervision, with many subordinate employees—trained, in training, and untrained—and with final expert management, for we deal directly with life and death as the ultimate termination of our endeavors.

Not the least of these activities is the drug department or pharmacy, and yet it is one which, in many hospitals, has received less attention than it deserves.

For the purpose of this discussion, hospitals can be arbitrarily divided into three groups: (1) the large hospitals, many of which maintain dispensaries and are obliged to and do employ pharmacists; (2) the medium sized hospitals, a few of which employ pharmacists, and (3) the smaller hospitals which usually depend upon the superintendent of nurses, who is also the hospital superintendent, for the dispensing of medicines and the purchase and issue of simple drugs, and send the few prescriptions they may have to a neighboring druggist to be filled.

Many of the Catholic hospitals have a Sister, who is a graduate of pharmacy or who has had special training in this work, in charge of the pharmacy, and other institutions make arrangements with a local druggist for his services for a short period of time each day, for issuing drug supplies, making stock mixtures and filling prescriptions. The practice followed depends largely upon the volume of work involved and the expense entailed.

Until quite recently it has been customary to make no charge for most of the medicines furnished, excepting serums, salvarsan and other costly articles, but with

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* Read at meeting, Chicago Branch, A. Ph. A., April 6, 1923.

[1] General Superintendent Englewood Hospital, Chicago, Ill.

the largely increased general cost of hospital maintenance, the increased cost of drugs and chemicals, and the greater demand for expert service of all kinds, I believe the hospitals generally are beginning to realize the necessity for having a qualified individual in charge of this department, and that a charge for medicines furnished is a legitimate expense to which all patients should be subjected. This additional revenue, therefore, helps to increase the general efficiency of the hospital and to make this department self-supporting—a very important factor in hospital administration.

The trouble with many apparently well conducted institutions is a lack of general efficiency in their conduct, and one of the besetting evils is the indiscriminate purchase and waste of supplies. This applies alike to government and civil hospitals, and I speak advisedly from an intimate knowledge of both classes of institutions based on an experience of over 20 years. I do not mean that the group of individuals comprising hospital employees or the department heads are incompetent. Neither do I mean that the patients do not receive good care; on the contrary, hospital employees are usually efficient, and the patients in practically all hospitals receive excellent care. I do mean, however, that this individual efficiency is not properly coördinated, all of which is evidenced by the financial balance sheet at the end of the year.

You say "what's the difference, the wealthy contributors to charity and the friends of these hospitals will make up the annual deficit." My reply is—they have done so in the past, and may continue to for some time, but they do not conduct their own business in that manner, and they will eventually insist that hospitals get on the same sane, sound basis.

One of the most important maxims of efficiency is "fixed duties and fixed responsibilities for all positions, with the coördination of individual efficiency into group efficiency."

A hospital administrator must be a versatile individual, but it is manifestly impossible for him to be an expert in all lines of business. Did any of you ever give his responsibilities a thought or stop to consider what a mass of well classified knowledge and information he must possess? He must have some general knowledge of law, of finance (banking and accounting), business administration and methods, medicine and surgery in all its branches, Roentgenology, pharmacy, nursing, building and construction work in all of its branches, engineering, painting, decorating and cleaning, household work, cooking in all of its divisions, laundering and laundry operation. He must also have a good general knowledge of the varieties and qualities of all kinds of general merchandise and the ability to purchase intelligently any or all of the articles used in hospitals, or which might be used in the construction, alteration or repair of a building, or its equipment.

Only few hospital administrators are medical men with any knowledge of pharmacy, and most of them are graduate nurses with no knowledge of pharmacy or any of its branches.

This brings us more directly to the hospital pharmacist.

To my mind the ideal hospital pharmacist—for a civil hospital—would be a man or woman of mature judgment, whose education in pharmacy had been supplemented by a sufficient experience in the drug business to insure competence in the purchase of drugs and chemicals and their preservation and care.

Your pharmacist is now equipped to accept a hospital position and to begin his postgraduate education. He must learn the drug needs of the institution, which are those of a household with from 100 to 500 sick members with many different ailments and all requiring more or less constant medication. He must make a study of the methods of the issue, handling and administration of drugs and medicines, with special attention to narcotics, for the purpose of insuring proper returns to his department for all items used.

He is now in a position to be of actual value to the institution and its administrative head. As the head of his department he becomes an assistant to the administrator of the hospital, to whom his loyalty must be unimpeachable. As such, he becomes responsible for the proper performance of all of the work of his department, he should act in advisory capacity in the purchase, and the regulation of purchases according to needs, or market conditions, of supplies for his department; he should seek to eliminate waste through various channels; eliminate the use of needless items, manufacture many preparations too frequently purchased, and in every way conduct the department as though it was his own business and upon which he was dependent for a livelihood.

As his acquaintance with the staff develops he will be consulted regarding matters connected with the medicinal treatment of patients—to a greater extent than pharmacists in the average drug store, and will eventually find himself acting (unconsciously) as an instructor in materia medica, pharmacy and the art of simple prescribing. He may, in addition, be called upon to lecture to student nurses on Materia Medica and Pharmacy, and to prepare reagents and solutions for other technical departments and the laboratories.

In some hospitals an opportunity to do some of the routine laboratory work may be developed. This, however, requires special training, is usually under other supervision, and is outside of the regular sphere of the pharmacist, whose time can be fully occupied by the work of his own department, if the hospital is large enough to employ him at all.

As the head of a department he is a member of the official hospital family. His social and fraternal relations with the administrator and his associates, and with the staff, will be in direct proportion to the dignity and efficiency with which his department is conducted and with the manner in which he conducts himself. Ability, personality and efficiency will usually receive from all sources the recognition it deserves.

To digress again for a moment—the question of education naturally comes up in connection with positions of this character—and it has recently become more acute, in connection with all the professions. Get this clearly—I am not opposed to higher education—I am strongly for it, but, I believe we are going too far in our preliminary requirements for admission to our professions, and that, as a result of our so-called raising of standards, we are creating classes of specialists who are too highly trained, and who are not only unwilling, but are also frequently unable, to do the routine work of their professions without highly specialized facilities and numerous assistants. At the same time we are, undoubtedly, preventing many ambitious young men and women of moderate means from making plans to enter a profession, who would serve the public in a capacity not filled by the specialist, and where the public is now lacking in service.

In conclusion, I believe the field for pharmacists in hospital work is large, and that it can be made better and greater. It should be especially attractive to the younger men and women to whom the sale of postage stamps, telephone slugs, candies, hair nets, etc., does not appeal, and for which their education is unnecessary. It should also be attractive to the older man who belongs to the "pre-lunch-counter-soft-drink drug store age," whose knowledge of pharmacy is an art and whose ideals eminently fit him for such a position.

COÖPERATING IN PHARMACY.*

BY HENRY B. SMITH.

A few years ago one of our presidents in his annual address to the American Pharmaceutical Association stated that every president had made many valuable suggestions for the benefit of pharmacy and pharmacists. Many of these ideas which required study and thought were referred to some committee, and then dropped into oblivion. The men who made the recommendations have had many and varied experiences in pharmaceutical matters and have the interests of the trade at heart. Some method should be found to have these many suggestions brought before Local Branches of the American Pharmaceutical Association for discussion, instruction and action.

The "tree" of pharmacy is a good old tree that has weathered many a storm. It has had many odd branches grafted on the original trunk, but it still lives and flourishes; keep the roots active and healthy and the branches and leaves will look after themselves. The roots are the local associations. A pharmacist should interest himself in his neighbors. So few recognize the power of the local organizations to regulate prices, hours of labor and many problems requiring coöperation.

A person purchases an established drug store. He immediately starts in to "stir up things"—new fixtures, new front—and rehabilitates the entire establishment—these things are very commendable and desirable. Then he starts to cut prices—there is where he makes the mistake.

Just as soon as he starts to cut, the trade in the entire district meets the cut and oftentimes goes lower. Consequently the public "laughs up its sleeve." Purchasing of goods sold at little or no profit to the retailer demoralizes the entire neighborhood for quite a period of time. There is where the local association comes to the rescue. In many localities a minimum schedule is adopted and service and personality are depended upon to increase the volume of business.

When we consider from best figures obtainable that the lowest average overhead of a retail drug store is 27.2% on the gross year's business, and if 50% of the business is of patented articles at 15% profit, not counting shelf warmers, a lot of work is being done without compensation or profit.

Many have tried the cutting game, and lost all they had and all the credit obtainable from manufacturers, jobbers and wholesalers, and then sell out. The local association tries to overcome these conditions. In many places stores have shorter hours and operate on the zone system, Sundays and holidays, usually four in a zone, one keeping open one in four Sundays and the other three stores exhibiting a sign directing people to the store open in that zone on that particular day.

* Read before Section on Commercial Interests, A. Ph. A., Cleveland meeting, 1922.

The next step is the state associations, but in many large cities the intermediary organization is composed of all the locals. New York City's intermediary organization is called the New York Pharmaceutical Conference who have accomplished an immense amount of good for the retailer; adjusting difficulties with the health, police and fire Departments and when committees from the Conference appear before any of the departments they are always given a respectful hearing and invariably get what they ask for.

The state associations are gradually assuming the aggressive attitude for pharmacy. "The hat in hand period" is passing. They are now demanding proper recognition and legislation from their various state representatives.

We expect in New York State at the coming session of the Legislature to enact the law that only registered pharmacists can own or conduct retail pharmacies.[1]

The State demands protection for public health, consequently the ends should justify the means. Some states demand compulsory membership in their state society; in the majority of states it is optional. New York State with an optional membership has increased its numerical strength two-fold during the last two years and in another year will approximate 90% of the pharmacists of the State—they realize the benefits of coöperation.

The "trunk of the tree" of pharmacy is the national body and I have always felt that the leaves and fruit of public health could best be cultivated through one consolidated national association. Many plans have been formulated, many ideas suggested, one will be presented for ratification at this meeting.[2] The simpler and less complex the plan the better. I suggested a plan a few years ago which was dropped. I hope this year's suggestions will have better consideration.

A National Headquarters and permanent representative at Washington is imperative; many things occur there that require immediate attention. Regulations are being constantly issued that require immediate rebuttal, officials that are not familiar with pharmaceutical conditions issue them with little thought or consideration; many have been recalled after causing the trade much trouble. Consequently, I feel that every pharmacist should identify himself with and give his moral and financial support to his local, state and national association.

One country, one flag and one National Pharmaceutical Organization!

HOW AND WHERE DRUG MERCHANDISE IS DISTRIBUTED.*

In a study of the distribution of merchandise our principal interest is concerned with an examination of the method whereby goods may be moved from where they are to where they are wanted with the minimum expenditure of time, money and effort. Much has been said in the popular press and elsewhere of the duplication of effort in distributing goods. In other words, the question has arisen as to whether or not commodities are handled too many times during the interval

[1] This has become an accomplished fact, which proves the value of coöperative spirit and action.—EDITOR.

[2] The reorganization of the American Pharmaceutical Association of the Cleveland meeting.

* Abstract of an address by C. H. Waterbury, Secretary National Wholesale Druggists' Association before the New York Branch of American Pharmaceutical Association, May 14, 1923, at New York College of Pharmacy.

between their actual production and their arrival in the consumer's possession.

In general it is almost safe to say that there may be too many middlemen, so called; but this condition has been brought about by the consumer himself in his desire to experiment with new methods of accomplishing distribution. He has set up a great many media of distribution, whose functions are to all intents and purposes the same. In each instance he thinks something has been eliminated, forgetting that what he has really done is to add to the complexity of our distribution problems.

In the drug trade we have observed a rather rigid adherence to what have become known as the legitimate channels of distribution; that is, from manufacturer to wholesaler, wholesaler to retailer, retailer to consumer. True it is that some business is done direct between manufacturer and physician and hospital and some direct between manufacturer and retail dealer. In each case, however, the functions of wholesaling must be performed. The storing of excess supplies, the extension of credit, the assembling and sorting of the goods, and their delivery, must be accomplished. Either the manufacturer himself must do these and bear all the expense incident thereto or the retail dealer or the consumer must perform them. Within the past few years, in conjunction with the representative of a number of nationally distributed magazines, I assisted in the preparation of a survey of the drug market of the United States.

This study elicited a number of very interesting facts. We first secured an estimate of the purchases through the drug trade by the consumer. This was done by taking the estimated total sales of wholesale druggists, to which was added the amount purchased by the retail trade from all other sources, and a fixed mark-up was added. Our estimate was $1,250,000,000 total sales to consumers of drugs and druggists' sundries, purchased through the 49,000 retail druggists of the United States. Taking the population at 105,000,000 and the number of retailers at 49,000, it appears that there is approximately one retail drug store for every 2,176 persons, and, if we average five persons to a family, there is one drug store to every 435 families.

Our immediate problem thereafter was to determine the best way to reach the 21,000,000 families of the United States through retail druggists with any manufactured product which may be efficiently, economically, and profitably merchandised through the drug trade. To the average individual living in a large city such as New York, the first thought seems to be of the chain store. This idea, we presume, prevails because of the frequency with which the individual in the large city comes in contact with the standardized store front and the standard label affiliated therewith. Our study, however, is not from the standpoint of any immediate locality but that of the country as a whole.

To look at the problem from a national standpoint it was necessary to make a study of the distribution of our population, taking into consideration the extent of urban and rural population.

In this connection it was deemed advisable to make a selection of leading urban centers not necessarily based on population. The full number of cities selected was 647 and these were chosen on the following bases:

First—Commercial Importance. Determined by the number of highly rated retail and wholesale establishments and by the number and size of the banks lo-

cated therein. The reasons for this basis of selection are almost obvious, for a city or town which has a number of large retail stores must provide a considerable volume of business to support them. Also, the number of wholesale houses in any given community indicates the importance of the particular center to the surrounding territory. The banking facilities of a given city also indicate dependence of other communities thereon as well as considerable business in the community itself.

Second—Population. As a rule, the number of people in a given city is an index to its importance as a trade center as growth of cities and towns is largely conditioned upon the volume of business done therein. It is generally true that cities with a large population afford greater inducements to out of town buyers, as they generally maintain stores carrying greater variety of wares, as well as better accommodations for transients than is the case with the smaller centers.

Third—The Number and Circulation of English Language Newspapers. This consideration serves as a guide to the extent of literacy prevailing in any given community. This factor naturally has a direct bearing on the extent to which advertising may be depended upon as an element in creating and maintaining demand for a given article.

Fourth—Transportation Facilities. A city or town which is the center of diverging transportation lines is more accessible to out of town buyers and can therefore draw on a larger territory than one not so situated.

Fifth—Population of Surrounding Territory. Cities and towns located in a thickly settled territory will naturally have more buyers to draw upon than a city or town located in thinly settled areas.

Sixth—Location with Respect to Larger Trade Centers. This is important in view of the location of nearby distributing cities; for example, a city like Montclair, N. J., could hardly be regarded as a favorable wholesale market in view of its proximity to Newark and New York.

In making the selection of these cities no one of these factors was the basic consideration but all of them combined. Our sources of information were the 1920 census figures where available and where these were not available, the 1916 estimates of the Census Bureau were used, directories of basic industries such as hardware, clothing, foods, and drugs, Dun and Bradstreet reference books, Lord and Thomas Directory of the American Press, direct communication with authorities in local trade centers.

Now, our next move was to consider the location of the various outlets of the drug trade with respect to these 647 cities.

At the time this survey was made there were 303 chain store organizations on record operating 1785 retail houses; 1560 of these stores, or 87.4% of the total, are located in 225 of the important centers, and 225 stores, or 12.6%, are situated in 157 outlying towns. It would appear, therefore, that chain stores are located in a little more than one-third (34.7%) of the principal centers of the United States. This point is brought out as it is apparently impossible to achieve national distribution through chain stores alone.

We could not overlook the fact, however, that the chain stores are located in cities serving about 33,500,000 people, or 31% of the population of the United States. A total of the annual sales made by 21 of the leading chains was drawn off

and this amounted to a little more than $75,000,000 as compared with a grand total of retail drug sales by 49,000 retail stores of $1,250,000,000. In other words, about one-sixteenth of the retail sales through drug stores were made by 21 leading chains. It is estimated that approximately 12% of all the retail drug business is done by the 303 chain store enterprises.

These figures, however, are not conclusive so far as the staple drug lines are concerned and should not be disturbing to the independent, wide-awake retail druggist. We must bear in mind the fact that the chain stores carry a much larger line of novelties and specialties than is generally true of the retail drug store. The chain store enjoys a larger proportion of specialty sales than is true of the average and many commodities represented in their sales are not sold in drug stores outside of the chains at all. From the manufacturer's standpoint the chain store at best is but one outlet towards securing national distribution.

The backbone of drug trade distribution seems to lie in the approximately 48,000 independent retail drug outlets scattered through the length and breadth of the land, who are dependent, because of their location and because of the character of drug store merchandise and the demand therefor, upon the wholesale druggist located in some of the leading cities.

By taking the directories of mercantile agencies and mailing lists it was found that something like 982 names bore the designation "wholesale druggist." Without respect to names, 341 wholesale druggists so called were deducted either because of the classification "wholesale and retail," or because of purchasing for two or three individually owned stores. Forty-two additional names were deducted because these were also included in the list of chain stores. With deductions totaling 363, the number of wholesale outlets thus determined was 599. Of this number, 292 were determined to be complete service wholesale druggists, the remainder being grouped as local buying clubs, dealers in specialties, coöperative wholesale houses, small chains, manufacturers carrying a few side lines, etc., but on the whole dealing in a limited number of rapid selling staples and a few specialties or buying only for stores holding stock in the enterprises. Such houses operate on a cash basis, employ no salemen, and do not cater to the full needs of the retail druggist or give general distribution to the products they handle.

The 292 service wholesale druggists were found to have 312 distributing points and 301 of these distributing points, or 96.4%, are located in 178 principal cities; while 11 locations, or 3.6%, are in 10 outlying towns. This fact shows the decided advantage from the standpoint of a manufacturer of securing national distribution at low unit cost by dealing exclusively with the wholesale druggist.

It is estimated that the total volume of wholesale drug sales is $417,000,000, 55% ($230,000,000.00) of which is in proprietary goods, meaning those articles to which certain individuals have the exclusive right to manufacture and sell; 14% ($58,500,000.00) fixed price goods not proprietary; 31% ($130,000,000.00) sundries and specialties on which the wholesaler establishes his own margin of profit.

A survey made by the Harvard Bureau of Business Research indicates that most retail druggists buy from two or three wholesalers and that about 60% to 65% of their requirements are purchased from wholesalers; the other 40% being scattered through many sources, depending upon the character of business in each instance.

In the wholesale drug stock there is a range of from 45,000 to 60,000 separate items and the retail druggists on the average carry stocks ranging from 8000 to 12,000 separate items. It is obvious that with a business of such detail no retail druggist can afford to carry a very large quantity of any one commodity but must have access to fresh supplies quickly and in the course of the year will dispose of items totaling 40,000 or 50,000. The natural result of this is a tendency to buy a variety of articles in very small quantities. From a manufacturer's standpoint, it appears that a national market can be most economically reached by dealing with 292 service wholesale druggists serving efficiently 48,000 retail druggists reaching an average of 435 families each and a total of 20,000,000 families.

In the foregoing no attempt has been made to set forth particular advantages of trading with wholesalers such as the ordinary economies to be effected in ordering on the part of the retailer a variety of commodities to be shipped on one package, billed on one invoice, etc., or to the economies on the part of producers in delivering to 178 market centers large quantities of merchandise at low transportation expense, billing a relatively small number of well-rated accounts. The purpose of this paper is merely to visualize in brief what the outlets of drug merchandise are—in other words, a picture of the drug trade as a market for merchandise.

MORE AUTHORITY TO BE ASKED FOR FOOD AND DRUGS RULINGS.

Greater authority for the joint committee on definitions and standards in its rulings as to the purity of foods and drugs will be sought as a result of the convention of the Central Atlantic States Association of American Dairy, Food and Drug Officials which met at Washington, D. C., April 23–25. A resolution was adopted to memorialize Congress through the Secretary of Agriculture to this end, and further to secure appropriations allowing more frequent meetings of the committee. Other sectional associations are expected to take like action. The committee at present consists of nine members appointed by the Secretary of Agriculture, who is charged with the enforcement of the Federal food and drugs law. While the findings of the committee are given legal force in many States by the State legislatures, officials feel that food and drugs laws could be administered more effectively if the committee had greater federal authority.

In the election of officers of the association for the ensuing year, Ole Salthe, director of the bureau of food and drugs, department of health, New York, was chosen president. I. H. Shaw, of the New Jersey department of health, was elected vice-president; and D. M. Walsh, chief of the Baltimore station of the Bureau of Chemistry, United States Department of Agriculture, was elected secretary. Two additional members of the executive committee named were A. L. Sullivan, food and drugs commissioner of Maryland, and Dr. C. J. Vaux, director of public health, Pittsburgh.

It was decided to hold the next convention at New York City. The selection of a date will be made later by the executive committee.

As a step toward more harmonious and effective administration of the State and Federal laws in the Central Atlantic territory, the convention appointed a committee on uniform standards and regulations. The committee will seek out differences between the various State laws that need clearing up, and make recommendations to the joint committee. Other sectional associations have formed similar committees. The newly appointed committee consists of C. S. Brinton, chief of the Philadelphia station of the Bureau of Chemistry, United States Department of Agriculture; W. W. Scofield, chief of the food and drugs bureau, New Jersey board of health; Dr. J. H. Shrader, board of health, Baltimore, Md.; A. L. Sullivan, food and drugs commissioner of Maryland; and Dr. H. H. Hanson, State chemist of Delaware.

THE BUSINESS SIDE OF PHARMACY

This department is devoted to the discussion of problems of business administration and commercial policies relating to the various branches of pharmacy.

CONDUCTED BY DR. ROBERT P. FISCHELIS.*

The very interesting paper on "Volume Production Pharmacy" by William H. Gesell in the May number of THIS JOURNAL contained a chart of monthly sales of pharmaceuticals which showed a selling curve that reached a peak in March and October, and fell to its lowest level in June and July. The writer of this article recently discovered a retail pharmacist who also takes the trouble to plot his sales on paper and the curve which resulted for the past years' business was practically identical with the one shown by Mr. Gesell. There is nothing particularly striking about this, but there is so little evidence of painstaking effort on the part of retail pharmacists, generally, in the matter of determining the facts about their business, that the discovery of one who does it just as any large manufacturer would and finds it an aid in arriving at proper conclusions regarding the conduct of his business, is indeed refreshing.

Knowing the facts about one's business is the first prerequisite to commercial success just as the analysis of a crude drug is a fundamental requirement for knowledge of its therapeutic action.

After the facts are established and pictured before us graphically it is our business sense which must dictate the plan of action and usually business sense is merely common sense.

Retail pharmacy is not the only line of business in which lack of knowledge of the facts and proper interpretation of them has proved a serious handicap to the success of the storekeeper. The trade journals in other lines bewail the lack of appreciation of this important detail quite as much as do our pharmaceutical journals. The remedy lies with the individual. Business is made very easy for the merchant of to-day if he takes advantage of the vast funds of statistical and other useful information placed at his disposal either free or at very low cost. The difficulty is to make the average retailer realize that the economic forces at work throughout the world cannot help but effect his business just as surely as they effect iron and steel mills, textile industries and the thousand and one other trades or businesses which make up the fabric of our industrial structure.

Too often one hears the pharmacist say, "I am not interested in the state of the stock or bond market—I am a druggist," or "the drop in the price of steel does not interest me—drugs are not made in steel mills." No wide-awake pharmacist can afford to ignore general trade conditions. He fools no one but himself when he believes that general business conditions are not reflected in the drug trade right up to and including the prescription and drug department. Ask any manufacturing pharmacist whether the general business depression of a year and two years ago had any effect on his volume of business and on his profits. Ask any wholesaler or retailer, who keeps correct records, the same thing. The answer will invariably be that volume in drugs dropped just as it dropped in textiles or locomotives or any other line. True it is that there was not less sickness during this period but never-

* Dean, New Jersey College of Pharmacy.

theless there was less drug business. The natural inference is that in times of depression people buy less of everything—including ready-made medicines. When they actually need medical advice and medicine they get both free at the hospitals and free dispensaries. In prosperous times they can afford to see a doctor and pay for their prescriptions. So the drug business in spite of the fact that it depends largely upon the health of a community fluctuates just like any other business and for the same reasons. Accepting this as a fact, does it not behoove the retailer to study national and international economic conditions? And how can this be done? There are a number of statistical services available like the Harvard University Bureau of Business Research, the Babson Statistical Service, and others which supply accurate and timely information on general business conditions and give forecasts of what may be expected, based on their experience and the records of previous business periods. Live business men use methods like this to keep in touch with conditions and regulate their buying and selling activities accordingly.

Another avenue for getting at the facts regarding general business conditions is to mix with other business men—rubbing shoulders with bankers, hardwaremen, grocerymen, builders, contractors, and others from time to time, by attending meetings of Chambers of Commerce, Boards of Trade, or other business men's organizations and listening to their conversation regarding the status of business. One cannot help learning something of value through such contacts. And then there are the pharmacists' own organizations. Many men consider that the value of attending pharmaceutical conventions lies not so much in what they learn at the sessions but in what they gain from conversations and exchanges of ideas and experiences with others between meetings in the corridors of the convention hotel or on the front porch after the sessions have been adjourned.

Coupled with an intimate knowledge of the facts of one's own business the broader range of information, obtained through the agencies mentioned, is bound to be a tremendous asset in the wise determination of future policies.

We spend hours in making out narcotic reports, prohibition reports, tax reports and what not, all because somebody must know certain facts about our business in order to successfully administer certain laws. Why not spend at least half as much time in compiling some figures that will do *us* some good and may be the determining factor in the ultimate success of our business and the acquisition of the competence which every man who enters business looks forward to?

Left—East wing of the Pennsylvania Hospital with "Elaboratory" on the right, the latter built in 1768. The Botanical Garden was an adjunct to the latter. Right—The Hospital Pharmacy. Liberty has been taken by inserting a picture of Dr. John Conrad, apothecary here from 1831–1870.—From "History of Pennsylvania Hospital," former p. 60; latter, p. 525.

THE DEPARTMENT OF THE AMERICAN CONFERENCE OF PHARMACEUTICAL FACULTIES

[EDITOR'S NOTE.—The discussion concerning the next step in the Conference program is continued this month.

Several years ago the Conference membership was startled and viewed with some concern the establishment of courses in pharmacy in the Cass Technical High School by the Board of Education of the City of Detroit. Those manifesting the most concern felt that it would be detrimental to the cause of pharmaceutical education for a municipality to place pharmaceutical instruction upon a high school basis. This fear was expressed in spite of the fact that many Conference schools were at that time and still are, and have declared their intention to continue that policy in spite of Conference rulings which they themselves helped to establish.

Recently the Editor has had an opportunity to come into personal touch with the Detroit situation. He has learned the reason why the Board of Education of that city felt justified in establishing and developing courses of pharmacy as a part of the municipal school system. The institution is now upon a four-year high school basis. The teaching staff and the unusual equipment command at once the respect of one who knows the pharmaceutical teaching plants of the country.

The Editor feels that it would be of value to the Conference and all pharmaceutical interests to know the story of Detroit's experiment in pharmaceutical teaching. He has therefore asked Mr. J. C. Moore, who is the head of the Science Group in Cass Technical High School, to give a brief history, for publication, giving the reasons why pharmaceutical teaching was begun, how it has been developed and what the plans for the future are. The keen analysis Mr. Moore has made of the whole pharmaceutical situation from the viewpoint of a broadly trained, clear-thinking layman, and how he set about to work out the results of this analysis with something definite in the Cass Technical High School, has been most helpful to the Editor and he feels it will be of value to the Conference.

An ever-increasing factor of importance in college life is the professional sorority and fraternity. Kappa Epsilon, the youngest of pharmaceutical sororities has just held its annual Grand Council meeting at the University of Nebraska. The Editor asked the historian to give a brief résumé of the meeting for the Conference section. He hopes that all pharmaceutical sororities and fraternities will avail themselves of the same privilege.

RUFUS A. LYMAN, *Chairman and Conference Editor.*]

THE NEXT STEP IN THE EDUCATIONAL PROGRAM OF THE AMERICAN CONFERENCE OF PHARMACEUTICAL FACULTIES.*

WILLIS G. GREGORY, of New York: (1) The Conference should stop its program of perpetual legislation and restriction and let the schools and boards have a little time to adjust themselves to present requirements and continue the program of securing prerequisite laws in the rest of the States.

(2) The Conference should turn its attention to problems of teaching so that the work of the Schools may be improved pedagogically.

It is my belief that each School can learn from other schools and that no one school has a monopoly in perfect teaching methods.

If some such program should be planned, it will be a pleasure to me to take part in a symposium on laboratory management.

HUGH C. MULDOON, of Indiana: The Conference should continue to work for an adequate general educational survey of all schools of pharmacy. Provision should be made for repeated inspection of the schools at stated intervals. When deemed practicable, four years of college work in pharmacy should be required. Research workers should be encouraged. The Conference should coöperate actively with other pharmaceutical organizations in an endeavor to standardize the laws governing pharmacy in the different states.

The educational program should not be limited to pharmacists and schools of pharmacy. More earnest efforts should be made to interest and instruct the general public by securing f. vor-

* Continued from May issue, JOURNAL A. PH. A.

able publicity in the press and by providing popular lectures by capable men. The improvement of current pharmaceutical literature and the encouragement of writers on pharmaceutical subjects will help.

ADOLPH ZIEFLE, of Oregon: Beginning with the next school year we will discontinue offering the two-year curriculum in pharmacy. For several years I have realized that the two-year course was inadequate for a thorough training in pharmacy, and I do not hesitate to express my views to my students and to the druggists in the state.

I petitioned our board of pharmacy for three successive years asking that they give their consent to dropping the two-year course but each time the matter was laid on the table.

Last summer I explained the proposition at the convention of the Oregon State Pharmaceutical Association and my plan brought the desired results.

Although we will not register students in the two-year curriculum, it will be necessary to confer the Ph.G. degree to former students who started on the two-year course.

E. R. SERLES, of South Dakota: The South Dakota program is as follows: The School of Pharmacy has maintained the entrance standards as outlined by the American Conference for 1923 since the year 1907 and it has been our earnest endeavor to allow only such students as have complied with the four-year high school requirement to enter as candidates for a degree in the School of Pharmacy. This has enabled us to have students of the very best type with which to work and has given us an opportunity to bring the same collegiate bearing upon the subjects offered in pharmacy as those of engineering or agriculture or any other science of the college.

Further, we likewise believe that the elimination of the two-year course in pharmacy will add to the type of pharmacists which we may graduate and hence we will not offer the two-year course in 1924 in keeping with which we are planning to add some definite commercial phases to the now highly technical course. The commercial subjects which we are planning to add will be: business English, business law and organization, typewriting, accounting, pharmaceutical jurisprudence, sign writing and window display. These subjects will not cut out any of the regular subjects such as materia medica, pharmacy and chemistry, but through the addition of a third year they will be distributed throughout the curriculum. However, the regular technical course composed of pharmaceutical subjects and chemistry may be taken at the discretion of the student and will lead to a Ph.C. degree.

KAPPA EPSILON—NATIONAL PHARMACEUTICAL SORORITY.

The Grand Council of Kappa Epsilon, National Pharmaceutical Sorority, was held on the fourth and fifth of May with the Beta Chapter at the University of Nebraska. Representatives were sent from the Universities of Minnesota and Iowa. All the grand officers were present at the convention, during which officers for the ensuing year were elected. The retiring grand officers are: Verle Bryan, Minnesota, President; Hazel Hahn, Nebraska, Vice-President; Naomi Kenefick, Iowa, Secretary. The incoming officers are: Naomi Kenefick, Iowa, President, Esther Lyman, Nebraska, Vice-President; Barbara Osborne, Nebraska, Secretary; Treasurer Maude Wieland, Iowa, and Historian Verle Bryan, Minnesota, were reëlected.

Business meetings were held on Friday afternoon and Saturday morning. Several changes were made in the constitution and the Sorority seal and crest were decided upon.

The Beta chapter entertained the visitors Friday evening at dinner, which was novel in that it was prepared by the girls themselves and served in the Pharmacy building. Later they all attended the "Yellow Lantern" which was written by a student and produced by the Kosmet Klub.

On Saturday morning the Nebraska chapter of Kappa Psi entertained the visitors and Nebraska members of Kappa Epsilon at a very delightful breakfast. At noon the girls enjoyed a delicious luncheon at the Phi Delta Chi house. The afternoon was spent at the Farmers' Fair which is an annual event staged by the College of Agriculture. On Saturday evening the convention was closed with a banquet at the Woodburn where covers were laid for thirty. Enjoyable toasts were given by representatives from each college. All expressed the opinion that it had been a most successful convention.

Kappa Epsilon was organized on May 13, 1921, when delegates from Nebraska and Minnesota met with the Iowa representatives at Iowa City. Minnesota was called the Alpha

Chapter, Nebraska, Beta, and Iowa, Gamma. Membership is limited to students in Conference schools. Besides upholding high scholastic standards, Kappa Epsilon promotes a bond of fellowship between students in different colleges.

At the convention held in Minneapolis in April 1922, the petition of Montana was accepted, making that the Delta Chapter. Petitions of several other schools were received at the recent meeting.

The next Grand Council will be held with the Gamma Chapter in Iowa City, about the first of May 1924.

PHYLLIS ROBERTS, *Historian of Beta Chapter.*

THE ESTABLISHMENT AND DEVELOPMENT OF PHARMACEUTICAL INSTRUCTION IN THE MUNICIPAL SCHOOL SYSTEM BY THE BOARD OF EDUCATION OF THE CITY OF DETROIT.

BY J. C. MOORE.*

Cass Technical High School is not orthodox so far as its various curricula are concerned. It has never attempted to be radical. It has tried and is trying to meet situations as it finds them, and if found to be irregular to change these irregularities after taking a survey and consulting those interested. The interested are the students, those who are to use the product—the employers, and organizations who are maintaining the ideals and the standards of the profession and vocation before the world.

The School wishes its students to be prepared as nearly as possible for the next step in meeting life. If they wish to go to the university they must not be handicapped by deficiencies in prerequisites. If they wish to discontinue their schooling, their abilities should be developed to the highest possible state of functioning in the fine art of making a living and in living.

In certain cities, the industries are highly specialized. Detroit has the automotive, chemical, and pharmaceutical industries as the basis of its commercial life. As a consequence, the Science Group has sponsored curricula in pharmacy, metallurgy, and industrial chemistry. The metallurgy and industrial chemistry curricula are six years in length, including the high school work. The pharmacy instruction includes a four-year pre-pharmic high school curriculum and a three-year college curriculum.

The Science Group has attempted to keep in close contact with the Associated Technical Societies of Detroit, consisting of thirteen Detroit branches of the national engineering and technical societies of the United States, with the Detroit Retail Druggists' Association, and with the Local Branch of the American Pharmaceutical Association. If it had not been for their frank criticism, regarding curricula and scope of work, and their loyal support in obtaining sufficient funds for building and equipment, our effort would have been futile.

The following brief concerns pharmacy particularly.

In the fall of 1912 a number of young men entered a night school chemistry class at the Cass Technical High School. Many of these students were interested in pharmacy, expecting to take the state board examination when experience and preparation warranted it. The School became interested in their problem so that the following year a special class in chemistry was opened for persons working

* Head of Science Group.

in retail and manufacturing pharmacies of Detroit. The class met three days a week from one to five P.M.

All of these men were adults varying in age from eighteen to thirty years. Some of them were well prepared—others showed a marked lack of preparation in fundamentals. It was an interesting group, as all were prospective pharmacists who would some day be guardians of the lives of the people. Some were enthusiastic about the work, others were not, but all seemed to have one goal—that is, the State Board Examination and registration.

Among other requirements, the Pharmacy Board of Michigan required all applicants to have completed the tenth grade or its equivalent in order to be eligible for the examination. It was fairly easy to determine when a student had credit for tenth grade standing if he had been in actual attendance at school. The question, however, that continued to reoccur was, "What was the equivalent to tenth grade?" In order to answer this and many other problems presenting themselves at this time, a survey of the employment situation in Detroit as pertaining to pharmacy was undertaken. In this Mr. Hackney, then secretary of the Detroit Retail Druggists' Association, gave valuable assistance. Also a number of retail pharmacists willingly gave of their time and experience. It was found that two classes of non-registered men made up the personnel in the retail store. It was evident one class of these men were deficient under both standards of measurement. They had neither completed the tenth grade in high school nor had they the equivalent in training and experience. So far as being able to produce results in chemistry was concerned, they were not equivalent to tenth grade high school boys. A student so evidently deficient generally had a history as follows:

a. Good appearance.
b. First impression good.
c. Had served in many positions.
d. Had started as errand boy when young because he did not want to attend school.
e. In some cases he would develop into a valuable adjunct to the store, but failed to further his ability in English, mathematics, and history or to discipline his faculties by the continuous pursuit of study along any one course.
f. Ethics, as a rule, was an unknown quantity.

Occasionally the non-registered man had become so proficient in his technic and salesmanship he would make a valuable relief man if registered. He had taken advantage of his opportunities, as night school, correspondence courses, lectures, and social activities. Often such a person, although lacking schooling, was superior to a high school graduate in education and power to accomplish. This type was decidedly in the minority, and usually he had a superior man as an employer who had been his sponsor and inspiration.

The conclusion drawn from study was as follows. Taking the boy from eighth grade and giving him two years of high school work immediately followed by two years of pharmacy would give a better-trained person than the average candidate for the state board for the following reasons:

a. A candidate was under the direction of the same organization for four years.
b. The weaknesses and shortcomings of the student were checked by a faculty that had an opportunity for a long-continued acquaintanceship.
c. Four years of discipline in study and conduct resulted in a higher standard of scholarship and ethics.

d. The continuance under the same arrangement during specialization often saved much time lost by the average student due to the necessity of becoming acquainted with a new situation.

e. Practical experience taken after leaving the four-year school was of greater advantage to the student and employer.

f. The standing of pharmacy and the grade of men going into it could be strengthened by such a school at that time.

As a result, a four-year pharmacy high school curriculum was constructed. In the development of this work, curricula from the seventy-five leading pharmacy schools and colleges of the country were carefully studied; the syllabus from the American Conference of Pharmaceutical Faculties was used as a check against it. The curriculum was submitted to the leading retail pharmacists of Detroit, some of whom were of broad experience and of national repute. It more than met all requirements, both state and national.

Two men deserve the greater credit for the work on the revised curriculum. One is Mr. Frederick Thomas Bradt, a graduate of Kalamazoo College, the University of Michigan School of Pharmacy, and Chicago University Graduate Department. Mr. Bradt worked in the Control Department of Nelson, Baker & Company under Dr. A. B. Lyons. The other man who has given much to the making of the present school is Mr. Ernest Ransom Crandall, graduate of Michigan University. Mr. Crandall has had much experience in the wholesale and retail field. At one time he was connected with the Kansas City Pharmacy School.

In time the curriculum was ready and successfully put into operation. It continued in full effect until the fall of 1922, and under it many high grade young men and women were graduated. In conjunction with this high school curriculum a continuation course was given, open to adult students having graduated from high school or who had actually completed the tenth grade and had had practical experience. The results which have been attained from this school of pharmacy are many and diversified. They might be summarized as follows:

a. General interest and criticism were aroused in pharmacy education, due to the fact that this school was connected with a high school and that a student could proceed immediately without transfer from his tenth grade into the pharmacy department and there carry on and complete his special education in pharmacy. If for nothing else, I believe the discussion which this school created would have justified the experiment as a factor in the general movement in the development of pharmacy education.

b. A more general and keener recognition of the fact that Michigan and many other states had a low prerequisite for registration. It might be said that while the people connected with this particular school lay no claim to having influenced legislation in the State of Michigan, however, a new law with a higher standard will become fully effective in this State January 1, 1923.

c. The product of the School, that is, those who graduated from the course, not the discard, have proved equal to the average graduate from average pharmacy school and far superior to the average applicant for registration. To point to definite cases, the first graduate of the Four-Year High School Pharmacy Course, of six years ago, has become a worthy alumnus and has served on the board of directors of the Detroit Retail Druggists' Association and headed an important local committee in the National Convention of the National Retail Druggists' Association recently held in Detroit. Also, in the January examination of 1922, in competition with close to one hundred fifty other applicants, the first, second, and third places, and in the November examination of the same year first and second places, came to the graduates of this

school. This is mentioned merely to substantiate the point given. Of course, as in all good schools, we had some disappointments on the examination.

d. The Detroit School System has raised the standard for those who wish to study pharmacy under its direction, and has organized the Detroit City College of Pharmacy, which has as a prerequisite graduation from a four-year accredited high school.

e. A faculty has been built up composed of university men and women giving their entire time to the courses as given in the pharmacy curriculum. Michigan, Chicago, Wisconsin, Ohio State, Nebraska, and Columbia Universities are represented in the faculty. Those giving the pharmacy courses are registered and a number have had experience in the larger manufacturing pharmacies.

f. The Detroit School System has invested $150,000 in pharmaceutical laboratories as a part of an investment of $1,700,000 in scientific laboratories, including chemical, physical, biological, bacteriological, and metallurgical laboratories.

It is recognized that the Detroit City College of Pharmacy still has much to experience and accomplish, but it is the belief of those interested that the organization, sometimes known as the Cass Technical Pharmacy School, but now known as the Detroit City College of Pharmacy, has contributed much to pharmacy. At the present, you will find in the Detroit School System a College of Pharmacy with high ideals, a faculty with a firm determination to see that these ideals are attained, and a superior physical equipment. You will find it as one among four city colleges being the nucleus of a municipal university of the future.

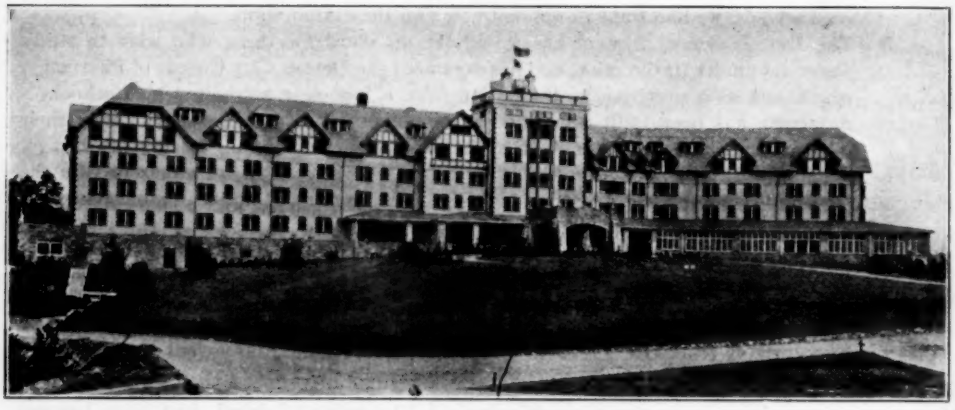
THE APPROACHING ASHEVILLE MEETING.

BY J. G. BEARD, LOCAL SECRETARY, A. PH. A.

As has been advertised from time to time the next annual meeting of the American Pharmaceutical Association will be held in Asheville, North Carolina, on September 3–7, 1923. Few places in the United States are better known than this resort city in the heart of the Blue Ridge Mountains, a region affectionately called by its admirers the Sapphire Country, and the Land of the Sky. The Appalachian chain, swinging south from Pennsylvania, sends off an eastern branch, the Blue Ridge, which gradually increases in altitude as it passes through Virginia, and attains its maximum heights in Western North Carolina in such peaks as Mount Mitchell, the "Top of Eastern America;" Pisgah; Grandfather; etc. Nestling among these tree-clad spires lies the city towards which the steps of American Pharmacy will turn next September on the occasion of the seventy-first annual meeting of the parent pharmaceutical association—the A. Ph. A.

Asheville is conveniently reached by railway or motor from any section of the country. Through Pullmans from St. Louis, Cincinnati, New York, Washington, Norfolk, Atlanta, and other points go direct to Asheville. State Highway No. 10 enters from the North and East; Highway No. 20 (Dixie) from Knoxville and the West; and Highway No. 29 comes into the city from Atlanta and the South. Complete information will be furnished in an early number of this JOURNAL concerning both railway and highway routes and distances from various points to Asheville.

Delegates to the A. Ph. A. meeting may exercise their own preferences in selecting hotel quarters. Between Grove Park Inn, advertised far and wide as the finest resort hotel in the world, and the Langren, a commercial hotel, every type of hostelry may be found in Asheville. The ones which will likely be selected are, in addition to the two just named, the Battery Park, Manor, Margo Terrace, Swannanao-Berkley, and Kenilworth Inn. The last named has just been selected as official headquarters and there, of course, the various meetings will be held. While some of the hotels mentioned operate on the European plan, a majority adhere to the American plan, as is often the case in resort centers. Kenilworth Inn, pictured here, is ideally located for convention purposes. Away from the noise of the business district, situated on a commanding hill that is wind-swept on the hottest days, and with every room an outside one that frames an ever-changing landscape panorama, the hotel offers a unique appeal to its guests.



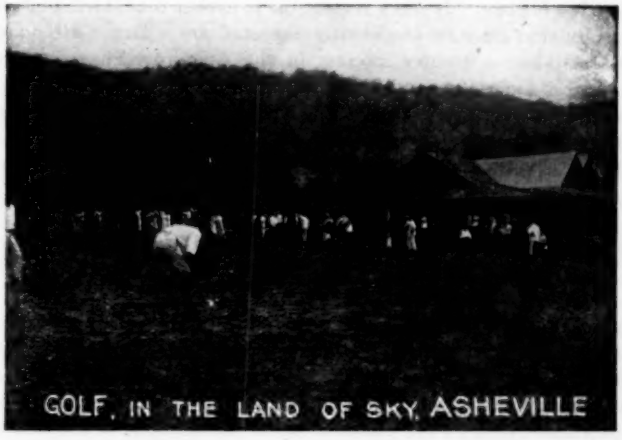
Kenilworth Inn, Asheville, N. C.

Nearer the heart of the city is an old hotel which has been famous for generations, the Battery Park. It too is located on a high hill that dominates the town below and offers an uninterrupted view of hundreds of mountain peaks spread out in every direction. Ordinarily the Battery Park is selected for conventions as large as the one of the A. Ph. A., but its owner, Mr. E. W. Grove, has begun the monumental task of reducing the entire hill, three blocks in area, to a level with other parts of the city, and the noise attendant upon such an engineering enterprise renders it unadvisable to attempt meetings there, even though the hotel itself and the ground immediately around it will be left unmolested until next year. This information is given because the Battery Park is so well known and because older members, remembering it as the location of the 1894 meeting, may wonder why it was not selected as convention headquarters. In next month's JOURNAL the Grove Park Inn, also owned by Mr. Grove, will be pictured and its advantages cited.

Battery Park Hotel.

Delegates at Asheville next September will find the mountains in the beginning of their greatest glory, which is in the autumn season. In the different ranges that comprise the Appalachian system in Western North Carolina, said by geologists to be the oldest mountains in the world, are twenty-three peaks higher than Mount Washington (New England's highest point); sixty-four peaks that are 6000 or more feet in altitude; more than a hundred whose height exceeds 5000 feet, and an innumerable number that exceed 4000 feet. Mount Mitchell, the highest mountain east of the Rockies, will be visited by the A. Ph. A. delegates. They will be driven to the top over a scenic motor highway eighteen miles in length, and arriving at the crest will be entertained in various ways later to be described. (Those so inclined may put in some pleasurable time "botanizing" in the neighborhood, for scores of medicinal plants are native to the section.)

Fishing and golfing around Asheville will appeal to delegates inclined to these sports. While the former cannot be obtained in the immediate neighborhood of the city, still a few miles' motor ride will bring one to Lake Junaluska, with a ten-mile shore line; Lake Summit, fourteen-mile shore line; and Lake Catawba, with a one hundred and sixty-four mile shore line. In addition there are numerous streams and brooks where mountain trout and bass will thrill the most



blasé angler. As for golf, there are two eighteen hole courses within convenient distance of hotel headquarters. The Asheville Country Club links are 6000 yards in length, while those of the Biltmore Forest Club, covering 130 acres, stretch out 6400 yards from the first tee to the "Nineteenth Hole."

In the foregoing nothing has been said as to the serious side of the approaching convention. It is still too early to announce details concerning the deliberative sessions, but in a general way it may be promised that the Asheville meeting will measure up to those of previous years not only in the amount of constructive work accomplished but in the character of such work.

CHAPEL HILL, N. C., May 16, 1923.

THE PROGRESS OF THE A. PH. A. REORGANIZATION PLAN.

BY WILLIAM B. DAY.

The fate of the plan adopted at the Cleveland meeting for extending the usefulness of the American Pharmaceutical Association through a closer affiliation with other pharmaceutical organizations, both state and national, is now in the hands of the state associations. It was thought best to present the plan in full to the state bodies before making any special effort to secure the coöperation of the other national organizations, for the reason that it was realized that favorable action by the state associations was the first requisite to the success of the plan.

The state associations which have held their 1923 meetings in the early months of the year have without exception endorsed the plan and approved of affiliation. This includes the state pharmaceutical associations of Minnesota, Iowa, Arkansas, Kansas, Louisiana and Oklahoma. Through their respective executive committees, Illinois and Maryland have also endorsed the plan—endorsements which will be ratified at their annual conventions. As the action in all states where the annual meetings have been held has been favorable, the prospects for securing the adoption of the plan at the state conventions, many of which are held this month, seem excellent and the outlook is most encouraging.

Some problems have arisen, notably the difficulty in securing a ten per cent. membership in the American Pharmaceutical Association, at once, in those states where membership in the state association is a requirement of the pharmacy law—that is, where every registered pharmacist on the payment of his registration fee becomes automatically a member of the state association. Possibly it will become necessary to modify the ten per cent. requirement in these states.

In connection with the state affiliation, membership campaigns are being instituted. It is realized, however, that the mere fact that the state association has affiliated on the ten per cent. basis will not in itself greatly increase the membership of the American Pharmaceutical Association at this time. Before a much larger number of new members can be attracted to the Association, it will be necessary to put the reorganization plan into effect and make evident its advantages to state association members.

The problem is a big one. It is not reasonable to expect that it will be rapidly worked out. The immediate results that may be confidently expected are a larger attendance of delegates from the state associations; a greater interest in the American Pharmaceutical Association, especially, in its House of Delegates, and a greater effectiveness in the work that the Association has undertaken to do for pharmacy as a whole. This work must necessarily be done in a large measure through the publications of the Association.

The new YEAR BOOK recently mailed to the members is a veritable treasure-house of information useful to pharmacists. Everyone interested in pharmacy, in any of its divisions, will find portions of the YEAR BOOK that will strongly appeal to him.

The JOURNAL is also developing. It shows a decided increase in the number of original papers this year, compared with last, and its circulation is steadily growing as the membership enlarges.

To gain and to intensify the interest of the members of the state associations in the American Pharmaceutical Association means the expenditure of both energy and time but these interests run so closely parallel with those of the parent association that ultimate success may be looked for.

A most encouraging feature of the whole movement is the cordial support that has been given to the reorganization plan by the pharmaceutical publications of the country. Practically every one of these has published in full the preliminary outline of the reorganization plan and a large majority have commented on it editorially. While not minimizing the difficulties to be overcome, these editorial comments have been uniformly favorable.

The possibilities of the plan are great. The various pharmaceutical organizations have much in common and by development along lines of contact, without interfering in any respect with the individual field occupied by each of these organizations, it should be possible to inaugurate a great coöperative movement for pharmacy that will promote its professional and scientific interests without neglecting its mercantile and legal side.

Above all, it should be borne in mind that the proposed plan is in process of development and gives promise of a useful future, if wisely guided and aided in its growth.

ABSTRACT OF REPORT OF THE TREASURER OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.*

JANUARY 1, 1922, TO DECEMBER 31, 1922.

E. F. KELLY, BALTIMORE, MD.

Receipts.

St. Louis City 4% Registered Bonds	$ 10,000.00	
Cash in Boston Penny Savings Bank	16,335.03	
Cash in International Bank of St. Louis	10,133.72	
Balance January 1, 1922		$ 36,468.75
Annual Dues and Journal 1920	5.00	
Annual Dues and Journal 1921	85.00	
Annual Dues and Journal 1922	8,713.25	
Annual Dues and Journal 1923	5,997.00	
Annual Dues and Journal 1924	17.00	
Annual Dues only 1922	128.00	
Annual Dues only 1923	80.00	15,025.25
Interest on St. Louis City Registered Bonds		400.00
Interest on Deposit National Exchange Bank of Baltimore		184.43
Interest on Deposit Boston Penny Savings Bank		743.34
Bank Exchange		.40

* Complete report will be printed in Volume 11 of the YEAR BOOK, A. PH. A.

National Formulary I, II, III		3.25	
National Formulary IV		8,087.27	8,090.52
Journal Advertising		7,176.50	
Journal Subscriptions and Single Copies		704.39	
Journal Miscellaneous		200.00	
Journal Reprints		464.93	
Journal Type Cuts		.75	8,546.57
Year Book		122.50	
Proceedings		8.00	
Bulletins		4.00	134.50
Gold Plated Buttons		.50	
Badges and Bars		30.15	30.65
On deposit for transfer to permanent funds			670.00
Receipts for the Permanent Funds			6,658.96
Receipts for the Funds held in Trust			503.76
Total of Receipts to December 31, 1922			$ 40,988.38

Disbursements.

JANUARY 1, 1922, TO DECEMBER 31, 1922.

By Voucher Check.		Appropriations.		Disbursements.
Salaries		$ 6,400.00		$ 6,550.00
Printing, Postage and Stationery		1,000.00		1,121.33
Clerical Expenses of Secretary's Office		416.00		408.00
Miscellaneous		200.00		133.16
Stenographers		350.00		201.72
Traveling Expenses		500.00		358.65
Committee on Membership		750.00		703.57
Committee on Unofficial Standards		100.00		
Year Books		11,439.70		12,449.40
Premium Treasurer's Bond		62.50		37.50
Auditing Treasurer's Books		80.00		75.00
National Drug Trade Conference		200.00		60.63
Section on Scientific Papers		35.00		32.50
Section on Education and Legislation		25.00		27.65
Section on Commercial Interests		25.00		
Section on Practical Pharmacy & Dispensing		25.00		30.00
Section on Historical Pharmacy		25.00		4.95
Women's Section		50.00		
National Syllabus Committee		25.00		25.00
Committee on Recipe Book		50.00		42.93
Committee on Local Branches		25.00		
Drug Trade Board of Public Information		250.00		236.52
War Veterans' Section		50.00		
House of Delegates		500.00		448.10
No. 25, Journal A (Publication)	$ 9,500.00		10,404.13	
No. 25, Journal B (Clerical)	1,000.00		973.00	
No. 25, Journal C (Post. & Sta.)	300.00		317.07	
No. 25, Journal D (Frt. Dray. & Mis.)	200.00	11,000.00	30.13	$ 11,724.33
National Formulary		1,000.00		2,890.87
Badges and Bars		50.00		18.00
Certificates		50.00		
Committee on Headquarters Bldg. Fund		450.00		233.50
Arny Honorarium		500.00		500.00
National Conference on Pharmaceutical Research		20.00		20.00

Total Budget Appropriations	35,653.20	
Total Disbursements against Budget Appropriations		38,333.31
From Current to Permanent Funds, including one-half net profit from N. F. IV for 1921 to Research Fund		2,249.53
Total Disbursement by Voucher Check		40,582.84
Amount Transferred to Permanent Funds		6,658.96
Amount Transferred to Funds Held in Trust		503.76
Total of Disbursements to Dec. 31, 1922		47,745.56

SUMMARY OF RECEIPTS AND DISBURSEMENTS.

Balance January 1, 1922	$ 36,468.75	
Receipts to December 31, 1922	40,988.38	$ 77,457.13
Disbursements to December 31, 1922	47,745.56	47,745.56
Balance Dec. 31, 1922		29,711.57
Boston Penny Savings Bank	15,078.37	
National Exchange Bank, Baltimore	4,633.20	
St. Louis City 4% Registered Bonds	10,000.00	29,711.57

COMPARISON OF TOTAL FUNDS:

Permanent Fund:

	Dec. 31, 1922.	Jan. 1, 1922.	Increase.	
Endowment Fund	$ 9,653.53	$ 9,057.58	$ 595.95	
Centennial Fund	3,866.95	3,722.17	144.78	
Research Fund	21,741.24	19,954.91	1,786.33	
Life Membership Fund	28,681.47	27,638.35	1,043.12	
Ebert Legacy Fund	5,606.01	5,167.11	438.90	
Ebert Prize Fund	1,362.27	1,346.85	15.42	
Headquarters Bldg. Fund	1,824.46	.....	1,824.46	$ 5,848.96
	$ 72,735.93	$ 66,886.97		
Funds Held in Trust:				
Wm. Proctor, Jr., Monument Fund	$ 11,117.76	$ 10,663.23	$ 454.53	
Jos. P. Remington Honor Medal	1,220.02	1,205.79	14.23	
	$ 12,337.78	$ 11,869.02		$ 468.76
Current Funds:			Decrease.	
St. Louis Bonds	$ 10,000.00	$ 10,000.00		
Boston Penny Savings Bank	15,078.37	16,335.03	$ 1,256.66	
International Bank	.....	10,133.72	.....	
National Exchange Bank	4,633.20	.....	5,500.52	
	$ 29,711.57	$ 36,468.75		$ 6,757.18
Summary:				
Permanent Funds	$ 72,735.93	$ 66.886,97		
Funds Held in Trust	12,337.78	11,869.02		
Current Funds	29,711.57	36,468.75		
	$ 114,785.28	$ 115,224.74	$ 439.46	
Assets:				
Permanent Funds	$ 72,735.93	$ 66,886.97		
Current Funds	29,711.57	36,468.75		
Total Assets	102,447.50	103,355.72		
Funds Held in Trust	12,337.78	11,869.02		
Total Funds	$ 114,785.28	$ 115,224.74		

Two items, one for $150.00 for salary and one for $6448.10 for the Year Book, Volume VIII, should have been paid during the year 1921, but, on account of delays in publication, were carried

into and paid during 1922. If these items, amounting to $6,598.10, had been paid during 1921, the increase in total assets of the Association during 1922 would have been $6,158.64 instead of a decrease, as shown, of $439.46.

W. ALBERT JOHNSON
Certified Public Accountant
543–553 Calvert Building
Baltimore

March 20, 1923.

Dr. E. F. Kelly, Treasurer,
American Pharmaceutical Association,
Baltimore, Md.
My dear Sir:

We have made an examination of the books and accounts of the American Pharmaceutical Association for the calendar year ended December 31, 1922.

All cash receipts for the period have been traced to deposits in bank to the credit of the respective funds for which received, and all disbursements have been found evidenced by properly authorized vouchers and cancelled checks.

All balances on deposit with various banks have been reconciled with certificates from the depositories, and all investment securities held by the Association have been examined and found to be in accord with balances shown by the records.

WE HEREBY CERTIFY that, in our opinion, the foregoing is a correct statement of the transactions of said Association for the period ended December 31, 1922, and is in accord with the books of account.

Respectfully submitted,
W. Albert Johnson & Company,
(Signed) W. A. JOHNSON,
Certified Public Accountant.

SUBSCRIPTION TO AMERICAN PHARMACEUTICAL ASSOCIATION HEADQUARTERS BUILDING FUND.

	Previously reported*.....	$6,926.90
No.		
162	A. C. Wagner, Ph.C., Everett, Mass.....	25.00 (Paid)
163	Mrs. Mary E. Apple, St. Petersburg, Florida.....	10.00 (Paid)
164	Henry C. Senecal, Plattsburg, N. Y.....	5.00 (Paid)
165	C. A. Stover, Cambridge, Mass.....	15.00 (Paid)
166	Chas. L. Davis, Newburyport, Mass.....	25.00 (Paid)
167	Minnesota State Pharmaceutical Association, By W. E. Burke, President, Gustav Bachman, Secretary.....	500.00
	Total.....	$7,506.90

May 7, 1923.

LAW REFORM ASSOCIATION OF NEW JERSEY PHARMACISTS.

The New Jersey Pharmaceutical Law Reform Association, whose declared purpose is to bring about the reform of certain acts which have been or may be passed by the State legislature detrimental to the profession of pharmacy, was organized on May 22 at Newark. The main topic of the organization meeting was the discussion of a new bill, effective in July, which gives the State board of pharmacy power to revoke or suspend any registered pharmacist's license if two violations of any pharmacy law of the State be found against the holder thereof.

The following officers were elected; President, Louis Schapiro, Newark; vice-president, Leon Richter, Passaic; treasurer, Isadore Lewenthal, East Orange; recording secretary, Harry Kemper, Newark.

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* For preceding reports on funds see Volume XI, 1922, JOURNAL A. PH. A., pp. 392, 644, 872; Volume XII, p. 90.

PROCEEDINGS OF THE LOCAL BRANCHES

"All papers presented to the Association and its branches shall become the property of the Association, with the understanding that they are not to be published in any other publication than those of the Association, except by consent of the Committee on Publication."—By-Laws, Chapter X, Art. III.

Reports of the meetings of the Local Branches should be mailed to the Editor on the day following the meeting, if possible. Minutes should be typewritten, with wide spaces between the lines. Care should be taken to give proper names correctly, and manuscript should be signed by the reporter. To maintain its activity and representation each branch should see that at least three of its meetings during the year are reported in the JOURNAL.

BALTIMORE.

A well-attended meeting of the Baltimore Branch of the American Pharmaceutical Association was held at the Emerson Hotel on Wednesday evening, April 25th, Dr. Hermann Engelhardt presiding.

Dr. John C. Krantz, Jr., read a paper entitled "Christianity and Science." Dr. Krantz is interested not only in pharmaceutical problems and research, but has found time to give this much-discussed subject his thought and attention.

Dr. Neil E. Gordon spoke concerning the "Scope of Colloidal Chemistry," which is also a subject that is now demanding the attention of research workers. Dr. Gordon's talk was not only instructive, but spicy and entertaining.

The students of the School of Pharmacy of the University of Maryland are very much interested in these meetings of the Branch, and attend whenever they have the opportunity.

There will be one more monthly meeting, which will end a very successful season of the Branch.

B. OLIVE COLE, *Secretary-Treasurer.*

CHICAGO.

The 135th meeting of the Chicago Branch of the American Pharmaceutical Association was held in the University of Illinois School of Pharmacy building, Friday afternoon, May 25, with President L. E. Warren in the chair.

The usual preliminary items of business were transacted, including announcements from Dean W. B. Day regarding the headquarters building of the A. Ph. A., and the annual meetings of the Illinois Pharmaceutical Association on the steamship North America, making a four days' trip on the Great Lakes, and of the American Pharmaceutical Association at Asheville, N. C., the first week in September.

President Warren then introduced the speaker, Mr. J. A. Hynes, Chemist and Drug Examiner in the Customs Service at Chicago, who spoke on the subject "A Pharmacist in the Customs Service."

The Association has been very fortunate in adding to its membership members of the graduating class at the College of Pharmacy, 75 per cent. of the 120 members of the class having already joined the Association. Therefore this concluding meeting of the present season was especially designed to impress these new members with higher ideals in pharmacy, enlarge their vision of pharmaceutical practice and gain their adherence to the principles of the American Pharmaceutical Association. Likewise the members of the class of 1924 were invited to this meeting, hence the attendance was very large.

The address of Mr. Hynes was not only very instructive and interesting, but contained many humorous passages and completely held the attention of the audience. He stated that while many were of the opinion that the ports of entry were exclusively on the seacoast and included such cities as New York, New Orleans, San Francisco and Seattle. Chicago, alone, receives customs duties exceeding one million dollars a month at the present time; he stated that the volume of imports into the port of Chicago was far in excess of the usual conception. Mr. Hynes dwelt in detail upon the procedure followed with those articles which are sent to the laboratory for examination and, then, presented many illustrations not only of routine work, but of odd or striking occurrences during his term of office, extending back over a number of years.

Following the address of Mr. Hynes an extensive exhibit of adulterated drugs was displayed and the remainder of the afternoon was profitably spent in the study of these exhibits. The United States Food and Drug Labora-

tories presented twelve specimens of adulterated drugs recently received for import. A specimen of the adulterated drug was accompanied by a specimen of the pure drug for comparison.

President Warren had an exhibit from the American Medical Association indicating the quantities of certain medicinal chemicals that could be purchased for the same amount as would be paid for much smaller quantities of imported chemicals sold under a patent or a copyrighted name.

The Miner Laboratories had an interesting exhibit showing the preparation of rolled oats and the utilization of the oat hulls which are produced in great quantities and have been largely a waste product. The oat hulls by special treatment are made to yield furfural, and from furfural a number of important products are obtained. The industry has developed until large quantities of furfural are now being obtained from this practically useless by-product of oats.

The faculty and students of the graduating class at the school presented a considerable exhibit of adulterated drugs and the means of detecting these adulterants. The number of specimens of this character that were presented exceeded fifty. The exhibit made by Mr. Hynes of the customs service was also of great interest and included a microscopic study of a fake sample of Neo-Salvarsan, which consisted of common salt and yellow coloring matter; the detection of coloring matter in teas; the determination of vat dyes in textiles; a "bug killer" that was ultimately found to consist of building cement; a Christmas tree made with feathers; "pottery" made from phenol condensation products, and ivory billiard balls prepared from everything but ivory.

The exhibit as a whole was very highly commended and was not only of great interest to the many visitors, but very instructive as well. E. N. GATHERCOAL, *Secretary.*

CINCINNATI.

APRIL MEETING.

The regular monthly meeting of the Cincinnati Branch of the American Pharmaceutical Association was held at the Lloyd Library, Friday evening, April 13th. The main feature of the evening was the illustrated lecture on "Physical Aspects of the Colleges of Pharmacy of the United States," prepared and presented by Dr. C. A. Mayo. Cincinnati Branch has been on the waiting list for this instructive lecture for some time, it having been shown at Cleveland, Pittsburgh, Indianapolis, Chicago, Minneapolis, Brookings, S. D., Lawrence, Kan., New York, Newark, Philadelphia, Baltimore, Richmond, Chapel Hill, N. C., Ann Arbor, Mich., and other cities. A hearty vote of thanks was offered Dr. Mayo.

MAY MEETING.

The annual meeting and election of officers of the Cincinnati Branch of the American Pharmaceutical Association was held at the Lloyd Library on the evening of May 22nd. The officers elected were: *President,* Dr. Caswell A. Mayo; *First Vice-President,* Mrs. Caroline Wetterstroem; *Second Vice-President,* E. H. Grant; *Secretary and Treasurer,* Miss Bertha Ott. F. W. Kisker was elected to fill the vacancy on the Executive Committee and Dr. C. T. P. Fennel member of the Council.

Louis Werner presented an abstract of a paper entitled "Preparation of Cod Liver Oil and the Effect of the Process on the Vitamine Value of the Oils," by Drummond and Zilva. An informal discussion followed this paper.

Dr Frank Cain, Chairman of Committee on Affiliations of Organizations," reported that plans are being made to have joint meetings of Cincinnati Branch of American Pharmaceutical Association and Ohio Valley Druggists' Association every other month during the coming year, with programs that will be of interest to both organizations.

BERTHA OTT, *Secretary.*

DETROIT.

The regular monthly meeting of Detroit Branch of the American Pharmaceutical Association was held at Ann Arbor, April 20th. After an excellent dinner at the Michigan Union, the regular session of the Branch was called to order in Room 215 of the Chemistry Building at 8:15 by the President, Prof. C. H. Stocking.

The first matter of business was the appointment of a nominating committee, consisting of Messrs. Scoville, Schettler, and Mann, to report at the next meeting.

Mr. Webster read a letter from R. L. Holmes with regard to an International Anti-narcotic Conference to be held in Washington during May, in which the request was made that representatives be sent from the local branch. It was moved by J. H. Webster that Messrs. Seltzer and Mann be the delegates and that the $10 registration fee be paid by the Local Branch; the motion was seconded by E. K. Field, and carried.

The program of the evening consisted of a series of short talks by members of the Phar-

macy Faculty of the University of Michigan.

Some very interesting observations were brought out by Prof. C. C. Glover concerning the depreciation of pepsin preparations and some substances that seemed to check such deterioration.

Mr. McGill discussed the use of hydrogen-ion concentration methods applied to estimation of alkaloidal strengths. Interesting comparative results were shown tending to favor such a method.

Leonard R. Wagner commented on aspirin tests, relating to:

1. Free acetic acid
2. Free salicylic acid
3. Variations in melting point
4. Variation in solubilities.

Prof. C. H. Stocking talked on the training of the prescriptionist, calling particular attention to the time given to such training in the University of Michigan. Dean Kraus presented an outline of the proposed curriculum for the College of Pharmacy, calling attention to its advantages.

The success of the evening's program was largely due to the efforts of President Stocking and members of the faculty.

The following are the officers of the ensuing year: *President*, E. R. Crandall; *Vice-President*, Leonard Seltzer; *Secretary*, B. A. Bialk; *Treasurer*, F. F. Ingram, Jr.; *Chairman of Program Committee*, E. R. Jones.

F. T. BRADT, *Secretary pro tem.*

NORTH CAROLINA.

At the April meeting of the University of North Carolina Branch, American Pharmaceutical Association, it was voted to admit those who were previously members of the American Pharmaceutical Association in the State to become members of the Branch. The secretary sent out letters of invitation to the various members and the following twenty-two members responded: K. E. Bennett, D. T. Briles, J. A. Goode, G. K. Grantham, C. P. Greyer, J. H. Hardin, J. L. Henderson, H. T. Hicks, W. W. Horne, P. A. Lee, Geo. A. Matton, R. A. McDuffie, E. E. Missildine, G. R. Pilkington, J. L. Sutton, I. W. Rose, J. P. Stowe, DeWitt C. Swaringen, S. E. Welfare, Joseph Hollingsworth, E. DeB. Ledbetter, E. V. Zoeller.

The final meeting for the year was held Friday evening, May 11, 1923. The officers for the next year were elected as follows:

W. A. Ward, *President.*

L. R. Brookshire, *1st Vice-President.*

H. E. Rees, *2nd Vice-President.*

C. R. Whitehead, *Secretary-Treasurer.*

E. V. Howell, *Member of the Council.*

The delegates appointed for the Asheville meeting are Prof. E. V. Kyser, Almond P. Westbrook and W. A. Ward, with the following alternates: J. Reeves, G. W. C. Rush and W. J. Hickman.

After the regular business the following illustrated lectures were presented:

"Identification of Bacteria and Preparation of Bacterins," Almond P. Westbrook.

"Preparation and Standardization of Diphtheria Antitoxin," G. W. C. Rush.

"Smallpox and Its Prevention," E. L. Reaves.

The members of the Branch are indebted to the H. K. Mulford Company for lending the slides and material for the above lectures.

During the month 15 new student members have been added, bringing the total membership of the Branch to sixty-four.

ALMOND P. WESTBROOK, *Secretary.*

PHILADELPHIA ASSOCIATION OF RETAIL DRUGGISTS DEDICATES ITS BUILDING.

The building of the Philadelphia Retail Druggists' Association, recently acquired by purchase, was dedicated last month. It is located at 2017 Spring Garden Street, and aside from the chief purpose of housing the offices and providing meeting rooms for members and the Association, there are permanent exhibits of articles and products handled by druggists. It is the first home to be owned by an association of druggists in Philadelphia, thus showing their faith in the organization; it is said also to be the only organization, affiliated with the N. A. R. D., which owns its own club house. There were about 500 members and guests present at the opening meeting; the ceremonies were presided over by President P. S. Rohm, and among the speakers were: C. P. Gladding, president, and Samuel C. Henry, secretary of the N. A. R. D., and B. E. Pritchard, of Pittsburgh, secretary of the Western Pa. R. D. A., Otto Kraus, secretary, and George W. Fehr, treasurer of the P. A. R. D.

EDITORIAL NOTES

Editor: E. G. EBERLE, Bourse Building, Philadelphia, Pa.

Committee on Publication: A. G. DUMEZ, *Chairman;* S. L. HILTON, H. M. WHELPLEY, R. A. LYMAN, W. L. SCOVILLE, and the Editor-in-Chief of the JOURNAL, General Secretary, Treasurer and Reporter on the Progress of Pharmacy, *ex-officio.*

Collaborators: JULIUS A. KOCH, President, A. Ph. A.; CHARLES H. LAWALL, President, A. C. P. F.; EDWARD WALSDORF, President, N. A. B. P.; E. FULLERTON COOK, Chairman, U. S. P. Revision Committee; W. L. SCOVILLE, Chairman N. F. Revision Committee; S. L. HILTON, Chairman, Council A. Ph. A. The Chairmen of the Sections, A. Ph. A.: ARNO VIEHOEVER, CROSBY B. WASHBURNE, W. F. GIDLEY, WALTER M. CHASE, CLYDE L. EDDY; E. F. KELLY and WILLIAM B. DAY of the House of Delegates; A. G. DUMEZ, Secretary of the Council, the General Secretary, and the Reporter on the Progress of Pharmacy.

OMISSIONS FROM THIS DEPARTMENT.

On account of additional matter in the preceding pages some of the Departments of this Section have been omitted from this number of the JOURNAL.

PHARMACISTS ARE NEEDED IN WEST CHINA.

Applications for information, etc., may be sent to the following addresses:

The Missionary Society of the Methodist Church, Canada; Wesley Building, Toronto, Can.

The Woman's Missionary Society of the Methodist Church, Canada; Wesley Building, Toronto, Can.

The Board of Missions of the Methodist Church North, 155 Fifth Avenue, New York, N. Y., U. S. A.

Mr. W. T. Clemens, Dillaye Building, Syracuse, N. Y., U. S. A.

The American Baptist Foreign Mission Society, Boston, Mass., U. S. A.

or to

E. N. Meuser, Phm.B., Chengtu, W. China.

A COLLEGE OF PHARMACY IN CHINA?

Charles O. Lee, now of Wuhu, China, formerly of Purdue University, whose active work in the meetings of the American Pharmaceutical Association will be remembered, in a letter to Treasurer E. F. Kelly suggests that the Association consider the advisability of aiding in the establishment of a Department of Pharmacy in a University of China. There is now no college of pharmacy in China, but the Rockefeller Foundation has contributed large sums for a medical school, and may be persuaded to consider the advisability of providing for a department of pharmacy. No further comment is made at this time because Mr. Lee has been asked to offer further suggestions along the lines he indicated, and he is acquainted with conditions and possibilities.

A LIBERAL DONATION TO THE A. PH. A. HEADQUARTERS BUILDING FUND, BY MINNESOTA PHARMACEUTICAL ASSOCIATION.

During the meeting of the American Pharmaceutical Association, in Cleveland, the Northern Ohio Branch, A. Ph. A., contributed $500 to the Headquarters Building Fund, and now the Minnesota Pharmaceutical Association has given a like amount. Both are examples which, it is to be hoped, will be followed by others, for they express an interest in the promotion of pharmacy. This should also awaken the individual interest and result in a large number of contributions between now and the Asheville meeting of the American Pharmaceutical Association.

Baron von Liebig is seated, on the right; F. Woehler is standing, on the left.

PERSONAL AND NEWS ITEMS.

Baron Justus von Liebig died April 18, 1873 (about 50 years ago). At the age of fifteen he was apprenticed to an apothecary in Pappenheim. His "Handbuch der Organischen Chemie" is part of Geiger's "Handbuch der Pharmazie" (1839). Friedrich Wöhler, Liebig's friend and co-worker, associated with him in many researches, was for a time pharmaceutical inspector. Both are shown in the group picture taken from the Ebert Memorial Volume.

The French Government has designated May 27 as "Pasteur Day;" proceeds derived from celebrations, sale of badges, etc., will be devoted to the promotion of French scientific education. Ambassador Herrick made the initial address of the occasion this year, followed by Prof. William Welch of Johns Hopkins; other speakers of prominence were Dr. William Thayer of Johns Hopkins; Dr. Pasteur Vallery Radot, a grandson of the scientist; Senator Selden Spencer of Missouri; Senator Paul Strauss, minister of hygiene of France. The Marquis and Marquise de Chambrun headed the joint committee in charge of the American celebration.

Mrs. Josie Wanous Stuart, who attended many of the meetings of the American Pharmaceutical Association a number of years ago, was decorated with a white carnation, emblematic of Mothers' Day, and suitably toasted by Geo. H. Goodrich, during the May meeting of the Minneapolis Veteran Druggists' Association.

Treasurer E. F. Kelly, A. Ph. A., and H. S. Noel, former chairman of the Section on Commercial Interests, A. Ph. A., will be speakers at the annual meeting of Virginia Pharmaceutical Association, to be held at Virginia Beach, June 25–27.

Ex-President L. D. Sale of the National Wholesale Druggists' Association, who has been seriously ill for some time, has improved in health to the extent of again being able to be at his desk.

Dr. Edsel A. Ruddiman—after commenting on the possibility and probability that climatic conditions in Tut-Ank-hamen's tomb were conducive to the preservation of organic matter, and poisons may have retained their potency—concludes with the following statements: "The chief potency of mystic incantations and curses lies in the mental complex of the individual upon whom they are exercised."

Alfred W. Pauley is directing the efforts of druggists in St. Louis to carry out the slogan of the Missouri Pharmaceutical Association, "Make the Drug Store Business Better."

M. J. Ulber, of Kansas City, Mo., president of the Missouri Pharmaceutical Association, was the principal speaker at the monthly meeting of the retail druggists of Springfield, Mo., held on May 23.

W. E. Bingham, secretary of the Alabama Pharmaceutical Association, recently spoke at a meeting of Alabama druggists favoring a school of pharmacy in connection with Birmingham Southern College. **W. P. Thomason,** of Guntersville, supported the suggestion made by Mr. Bingham. **B. O. Shifflet** asked that consideration be given to extend an invitation to the American Pharmaceutical Association to hold the 1924 meeting in Birmingham.

Dean Wortley F. Rudd was elected chairman of the Virginia Section of the American Chemical Society, at the recent annual meeting.

C. H. Goddard has resigned as president of the American Druggists' Syndicate; he is succeeded by F. H. Jones.

Charles R. Sherman of Sherman and McConnell Drug Co., Omaha, has retired from the firm by disposing of his holdings to his partner, A. R. McConnell. He joined the American Pharmaceutical Association in 1889; for many years he was an active participant in the annual meetings and was chairman of the Section on Commercial Interests, 1904–1905.

J. Leon Lascoff advertises his prescription department by the distribution of an 8-page booklet, which acquaints the patron with the importance of careful service.

It has been demonstrated that pharmaceutical subjects interest the public. Lectures, open to the public, at the Philadelphia College of Pharmacy and Science have been well attended; they are now being broadcasted on Saturday evening of each week. "The Romance of Spices" by Dean Charles H. La Wall came over the radio June 2.

The Department of Commerce has announced the appointment of Dr. Frederick E. Breithut as Chemical Trade Commissioner on the Staff of Commercial Attaché Herring at Berlin, Germany.

The post of drug examiner for the Port of New Orleans has been abolished. This office was established in 1871 and has functioned continuously until the death of Examiner Marshall M. Bradburn, a few months ago.

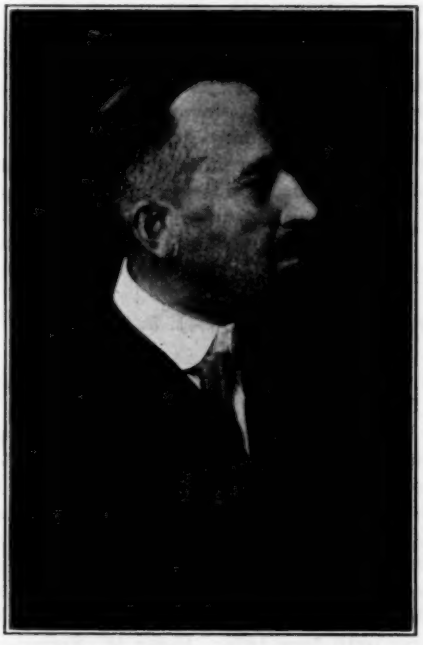
The U. S. Department of Commerce bulletins advise dealers and manufacturers of trade conditions abroad. A recent number of "Squandering Good Will Abroad" points out the need of giving better consideration to foreign patronage.

A Federal Reserve Bank Bulletin, in commenting on the drug business, states that there has been a gain in volume of business. The crude drug market has been quiet and the price changes have not been important. Stocks of drugs in the hands of wholesalers are moderately heavy, but the majority of reports show that they are not increasing. Finished stocks in the hands of chemical manufacturers are light and are decreasing. Plants are operating at about 90 per cent. of capacity. Collections are fairly good.

The Hospital Buyer is published in the interest of hospitals, but many of the articles have value for retail pharmacists.

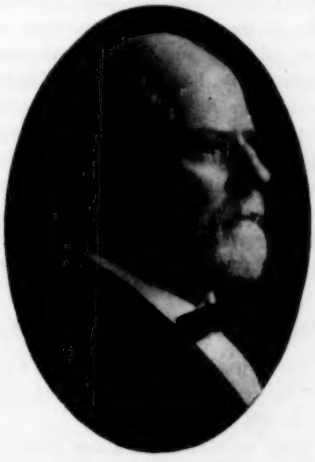
OBITUARY.

John Hepburn—druggist at Flushing, N. Y., for more than half a century—died at his home on May 20th. He was a member of the Flushing Board of Trustees and an organizer of the Business Men's Association of his home city. He was a member of the New York Pharmaceutical Association, and joined the American Pharmaceutical Association in 1873. His widow, a son and two daughters survive him.



THE LATE PROFESSOR H. H. GAETZ,
Director, School of Pharmacy, Univ. of Alberta, Canada.

Louis Cass Hogan died in Chicago May 20th, aged 69 years. He was born in Pontiac, Mich., and came to Chicago in 1871. He graduated from the University of Illinois School of Pharmacy in 1874, and from 1886 to 1889 was Assistant Professor of Pharmacy in the College. From 1890 to 1895 he was a member of the Illinois State Board of Pharmacy. For a number of years the deceased was engaged with B. S. Cooban and Co., of Chicago, and during this time contributed many articles to the pharmaceutical press. He was editor of the *American Drug Clerks' Journal* and its successor, *The Registered Pharmacist*, from 1887 to 1890. He joined the American Pharmaceutical Association in 1890 and was secretary of the Section on Education and Legislation from 1890 to 1894.



ALFRED MELLOR.

Alfred Mellor, member of the American Pharmaceutical Association since 1864, died May 30 at his home in Germantown, Philadelphia. His widow and two sons survive him. A brief notice relating to Mr. Mellor will be found on p. 253, April JOURNAL, 1919.

Ralph B. Gable died at his home in Vineland, N. J., May 8th. Mr. Gable was employed for a number of years by Merck & Company

of New York and was well known to the retail drug trade, and quite active during many years in association work. He was the author of a souvenir booklet, "Under the Shadow of the Skyscrapers," prepared by him for the annual meeting of the American Pharmaceutical Association in New York City in 1907.

George E. Gibbard died at his home in Lorne Park near Toronto on May 8th, aged 73 years. Prior to coming to Toronto, Mr. Gibbard was in the retail drug business at Darlington, Ont. He was very active in the organization of the Canadian Pharmaceutical Association, and for many years was the proprietor and editor of the *Canadian Pharmaceutical Journal*.

Frank H. Rosengarten, prominent as a chemist before his retirement in 1897, died May 7th at his home in Philadelphia, aged 80 years. He was a native of Philadelphia, the son of the late George D. Rosengarten, founder of Rosengarten and Sons, which firm was consolidated with Powers and Weightman in 1905.

Samuel S. White, first president of the S. S. White Dental Manufacturing Company, Philadelphia, died May 18th, aged 69 years.

SOCIETIES AND COLLEGES.

PROGRESS IN THE REORGANIZATION PLAN OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

June is the month during which most of the State Associations hold their annual conventions. The plan is regarded with favor, as indicated by the action taken by the Associations that have held their annual meetings—Minnesota, Iowa, Oklahoma, Kansas and Louisiana have given their approval; Illinois Pharmaceutical Association, through the Executive Committee, has also approved the plan. It is most pleasing to note the cooperation of the pharmaceutical press; all the publications have given publicity and quite a number have commented editorially. Their interest is that of the American Pharmaceutical Association, for all of them have representation in it through individual membership.

See a more extended comment by Secretary William B. Day in this issue of the JOURNAL, p. 551.

SCIENTIFIC SECTION, A. PH. A.

The following communication has been received from the officers of the Scientific Section, A. Ph. A.:

This year we desire to allow each member who will present a paper sufficient time to intelligently present his subject and also permit of discussion by the members. In order that we may have sufficient time to arrange and print the program, we respectfully request that all subjects be placed in the hands of the Secretary not later than July 15th. Papers received after that date cannot be assured of a place on the program and presentation can only be permitted as time may allow.

It will greatly assist the Secretary in outlining the work if the prospective contributors will submit the following information:

1. Title.
2. Statement indicating: Length of time (minutes) required to present the papers.
3. Need for lantern, microscope, or other equipment. Abstract, not exceeding 100 words, setting forth aims, significance and results of the work.

It is further planned to set aside part or whole of one meeting as a "stunt show," at which novel methods for drug analysis, scientific work, or laboratory manipulations will be described, interesting scientific exhibits will be shown, or demonstrations be made of new or unusual forms of apparatus helpful in pharmacy. Contributors to this "stunt show" are solicited and nature of contribution should be indicated.

ARNO VIEHOEVER, *Chairman.* J. P. SNYDER, *Secretary.*

COMMITTEE ON PHARMACEUTICAL BOTANY AND PHARMACOGNOSY.

At a recent meeting of the Division of Biology and Agriculture of the National Research Council held at Washington, D. C., the Committee on Coöperation from the American Pharmaceutical Association was changed to the status of the Committee on Pharmaceutical Botany and Pharmacognosy of the Division, and the following elected as its personnel to serve until June 1924: Heber W. Youngken, *Chairman*, Henry H. Rusby, Arno Viehoever, E. N. Gathercoal and E. L. Newcomb.

MEETING OF THE BOARD OF TRUSTEES OF THE U. S. PHARMACOPŒIA.

The Board of Trustees of the U. S. Pharmacopœia held business sessions in Cincinnati, May 4 and 5. The meeting was made memora-

ble by a dinner given to the Board by the Ohio Valley Druggists' Association and the Cincinnati Branch of the American Pharmaceutical Association. More than two hundred guests were present, many of them physicians of Cincinnati.

The speakers were introduced by Frank H. Freericks, chairman of the Joint Committee of the hosts. Among the speakers were—Prof. C. T. P. Fennel, Dr. Charles E. Caldwell, Prof. J. U. Lloyd, Dr. James H. Beal and Dr. Solomon Solis-Cohen. The latter said, in his address, that he believed in the inclusion in the Pharmacopœia of all the medicines which time and experience had demonstrated as being helpful, and he felt that any excessive pruning of the Pharmacopœia would be a grave detriment to both medicine and pharmacy. He urged pharmacists to assert their prerogatives as professional men, but warned them this assertion would carry with it the obligation to conduct pharmacy as a profession, to really prove that the druggist was more than a merchant.

GRIEVANCE COMMITTEE OF THE NATIONAL DRUG TRADE CONFERENCE.

President Samuel C. Henry, of the National Drug Trade Conference, recently appointed the following special committee to take up trade grievances with the executive departments of the federal government in Washington:

Samuel C. Henry, Chairman.

National Wholesale Druggists' Association, C. M. Kline.

American Drug Manufacturers' Association, J. C. Roberts.

American Pharmaceutical Association, A. R. L. Dohme.

Proprietary Association, J. H. Hinds.

National Association of Retail Druggists, Ambrose Hunsberger.

American Pharmaceutical Manufacturers' Association, J. H. Foy.

American Conference of Pharmaceutical Faculties, E. F. Kelly.

National Association of Boards of Pharmacy, H. C. Christensen.

DRUG AND SURGICAL DRESSINGS INDUSTRY MOBILIZATION PLANS.

Representatives of the surgical dressings industries conferred with War Department officers May 23, regarding plans for industrial preparedness in event of war. The industry was represented by Dr. Henry C. Lovis, New York, G. T. Bauer, Chicago, and Frank R. Jones, New Brunswick, N. J. It is understood that Messrs. Lovis, Bauer and Jones are being commissioned lieutenant colonels in the Officers' Reserve Corps. The following drug manufacturers have been commissioned lieutenant colonels in the Officers' Reserve Corps, Sanitary Department, to coöperate with the department in industrial preparedness, with a view to mobilizing the manufacturers of drugs and medical supplies in event of war: Dr. Albert S. Burdick, president of the American Drug Manufacturers' Association, Chicago; Ralph R. Patch, vice-president of the association, and Willard Ohliger, vice-president of the association; Charles G. Merrell, member of the executive committee of the association, Cincinnati; J. Fred Windolph, Norwich, N. Y.; Nicholas H. Noyes, Indianapolis; A. G. Rosengarten, Philadelphia; Donald McKesson, New York; and Frank L. McCartney, St. Louis. Harry J. Schnell, of the *Oil, Paint & Drug Reporter*, has been commissioned a major in the Officers' Reserve Corps.

A number of commissions as captains and lieutenants in the Officers' Reserve Corps have been, or will be given to persons connected with various large drug manufacturers throughout the country, one or two with each concern.

It is understood that arrangements are being made by the department to meet with various groups of manufacturers during the summer conference and instruction in connection with the industrial preparedness program.

SILVER ANNIVERSARY OF THE NATIONAL ASSOCIATION OF RETAIL DRUGGISTS.

Coöperating with the officers of the National Association of Retail Druggists, the Boston committee of retail druggists is rapidly maturing its plans for the annual convention of the N. A. R. D., in that city, September 24–28, inclusive. The convention this year will mark the silver anniversary of the association and every effort will be made to have present the pharmacists who took part in the original deliberations, twenty-five years ago, at St. Louis. Many of them are still actively engaged in business.

OFFICERS OF ARKANSAS ASSOCIATION OF PHARMACISTS.

Ed Bradley of Hot Springs was reëlected president of the Arkansas Association of Pharmacists; the other officers are: C. R. Counts, Mulberry, *vise-president;* P. R.

Turner, Marianna, *second vice-president*, and Miss A. Fein, *secretary*. C. K. Hegarty, L. K. Snodgrass, S. V. Bracey and Felix W. McClerkin, all of Little Rock, were named on the executive committee. Little Rock was selected as the next convention city. The date will be set later by the executive committee. The meeting was largely attended; Dr. E. A. Ruddiman and E. V. Sheeley of Memphis were among the speakers. President Bradley, in his address, criticized the action of the Legislature for not providing better means for stopping illegitimate sales of alcoholic liquors, and setting aside special qualification requirements prescribed by the State Board of Pharmacy.

OFFICERS OF LOUISIANA PHARMACEUTICAL ASSOCIATION.

The following officers were elected by Louisiana Pharmaceutical Association for the ensuing year: Joseph H. Berner, of New Orleans, *president;* Warren E. Scott, of Oakdale, *first vice-president;* August C. Flach, of New Orleans, *second vice-president;* Adam Wirth, *treasurer;* George W. McDuff, *secretary*, and Miss Lurline Wilson, of Independence, *corresponding secretary*.

Governor Parker of Louisiana and E. C. Brokmeyer were among the speakers during the convention.

Shreveport was chosen as the place for holding the convention in 1924.

THE CAROLINA ASSOCIATIONS.

The Carolinas Pharmaceutical Show will be held in Textile Hall, Greenville, S. C., on June 26, 27 and 28. The occasion is a joint meeting of the North Carolina and South Carolina Pharmaceutical Associations. There will be a three days' session, with special entertainment, banquet, etc. Many exhibitors have engaged space for the event.

MAINE PHARMACEUTICAL ASSOCIATION MEETING.

Information has been received from the Secretary, Dr. M. L. Porter, that druggists of Maine have, after considerable difficulty, been able to change the dates of their state convention from September 26, 27, and 28, to September 19, 20 and 21. This change has been made so as not to conflict with the dates of the N. A. R. D. meeting, to be held in Boston during the week of September 24th. The Maine convention will be held at the Poland Spring House.

STATE PHARMACEUTICAL ASSOCIATION MEETINGS.

In naming the dates for State Association meetings in the May JOURNAL A. PH. A., p. 469, for May and June, the Connecticut and New Hampshire meetings were omitted. The former will meet at Bridgeport, June 26–27; the latter at Lake Sunapee, Granliden Hotel, June 28–29.

The meetings scheduled for July are: Montana at Billings during 3d week of July; Ohio at Cedar Point, 16–20; Rhode Island at Providence, 11; Tennessee at Tate Springs, 17–19; Washington at Bellingham, 24–26.

August meetings: North Dakota at Bismarck, 7–9; South Dakota at Aberdeen, 15–17.

September meetings: Oregon at Pendleton, 18–19; Maine at Poland Springs, 19–21.

Idaho Association meets at Pocatello, October 11–12.

A. PH. A. MEMBERSHIP PRIZES.

While, undoubtedly, most schools of pharmacy have given prizes of membership in the American Pharmaceutical Association, we have notice of the following from Massachusetts College of Pharmacy:

Prizes consisting of a nomination to membership and the first year's dues in the American Pharmaceutical Association are awarded for the best year's records in senior subjects as follows:

1. For the best year's average in all subjects—awarded to J. Burks Harley.
2. Offered by Professor La Pierre for the best record in senior pharmacy—awarded to Moses W. Doyle, Jr.
3. Offered by Dean Bradley for the best record in senior analytical chemistry—awarded to Anselmo Ortiz León.
4. Offered by President Glover for the best record in senior general chemistry—awarded to George L. Golding.
5. Offered by Treasurer Godding for the best record in senior organic chemistry—awarded to Charles A. Lynch.
6. Offered by Professor Smith for the best record in senior materia medica—awarded to Francis J. Balanda.

The JOURNAL will be pleased to receive notice of membership awards made by other schools of pharmacy for mention in these columns.

EXPANSION OF THE NEW YORK COLLEGE OF PHARMACY.

A communication from Dean H. H. Rusby, of Columbia University College of Pharmacy of the City of New York, gives briefly an account of the growth of this institution and the efforts made to meet its requirements in serving pharmacy. We are taking the liberty of quoting from the communication, feeling assured that there are many who will be glad of the opportunity to share in making this larger institution possible, for which about $250,000 are required. An extract from the letter follows:

"Last fall, after it had been found necessary to turn away two or three hundred applicants, the necessity of securing additional room was apparent to everyone familiar with the situation, and the Faculty was invited to submit outlines of the requirements of their respective departments. The response was prompt, but the extent of the requisition was appalling. Besides calling for lecture halls, recitation rooms and laboratories for a class of two-year students, fifty per cent larger than any previous one, large sums were asked for perfecting the accommodations for advanced classes, and to equip research laboratories for professors and specialists."

A lot adjoining the present building has been purchased and preliminary work is under way. Initial payments were made out of the current funds of the treasury, and continued by the early subscriptions of generous friends, some fifty thousand dollars being subscribed by the Board of Trustees. The interest of the undergraduate students was manifested by subscriptions amounting to $28,000, to which $3000 were added by the members of the faculty. To secure the total amount required and insure success of the undertaking, many subscriptions of large amounts must be forthcoming, and a campaign is under way.

THE PHARMACIST AND THE LAW.

THE KNOX DECISION.

The New York Commercial comments editorially on the Knox Decision:

"The decision of Judge Knox that Congress had no right to dictate to a physician what he shall prescribe for his patient is entirely in line with conservative thought on this subject. That amendment to the Volstead law is clearly unconstitutional. It may be that unscrupulous physicians will abuse their power, but that does not alter the fact that Congress went beyond the Constitution in making the restriction. The Eighteenth Amendment, in words as plain as the English language can make them, limits the enactment of laws against liquor when used for beverage purposes. There can be no mistaking its meaning, and yet, regardless of that, Congress placed restrictions upon the use of liquor for medicinal purposes. It doesn't matter what one's views may be, for or against Prohibition, there is the Constitution, there is the English language, and that is all there is to it."

The New York Times concludes an editorial in which there is much food for thought:

"Would the medical profession itself be able to maintain its prestige unimpaired if suddenly and without its own consent it was shouldered with the privilege of dispensing liquor without restraint or limit? What would this privilege do to the habits and conscience of the youthful medico struggling to make a living? Druggists who take their profession seriously are now profoundly irritated by uses which licensed adventurers have been making of it since the first days of Volsteadism. And it is certain that all self-respecting physicians would be humiliated by the spectacle of a swarm of embryo bootleggers rushing through the colleges in order to obtain the right to distribute whisky without fear of the law."

RESOLUTIONS OF THE AMERICAN REPRESENTATIVES AT THE LEAGUE OF NATIONS' OPIUM COMMITTEE IN GENEVA.

The following are resolutions proposed on behalf of the United States by Hon. Stephen G. Porter; they present the position of the United States on Narcotic Drug Control:

"1.—If the purpose of the Hague opium convention is to be achieved according to its spirit and true intent, it must be recognized that the use of opium products for other than medicinal and scientific purposes is an abuse and not legitimate.

"2.—In order to prevent the abuse of these products it is necessary to exercise the control of production of raw opium in such a manner that there will be no surplus available for non-medicinal and non-scientific purposes.

"3.—The nations which are parties to The Hague opium convention are urged to bend every effort to induce the nations which are not parties to the convention, or which have not yet enacted legislation to put it into effect, to do so at once.

"4.—Those nations which have well-developed chemical and pharmaceutical industries are urged to prohibit the importation of all narcotic drugs except such quantities of crude opium and coca leaves as may be necessary to provide for medicinal and scientific needs.

"5.—All nations are urged to prohibit the exportation of narcotic drugs, including opium in whatever form and coca leaves and derivatives of these drugs, to those countries which are not parties to The Hague Opium Convention and which do not have domestic systems of control—including import and export certificates."

An Associated Press dispatch of May 30, states:

"Strict limitation of the production and sale of prepared opium under absolute government monopoly was approved by the opium advisory committee of the League of Nations. The vote was 6 to 1, with France casting the negative ballot and Portugal abstaining.

"The vote of the commission refers to recommendations to the council of the League of Nations which is to meet shortly in Paris."

NARCOTIC DRUG CONSUMPTION HAS DECREASED.

Federal Prohibition Commissioner Haynes has announced that the records of the Narcotic Division of the Prohibition Unit show a very material decrease in per capita consumption of opium and cocaine during the last three years.

The official records of the division show that during the fiscal year ending June 30, 1921, the sales of opium, morphine, cocaine, heroin, and dionin made by manufacturers were sufficient for one and seven-eighths grains of morphia per capita, whereas during the fiscal year ending June 30, 1922, the quantity of opium imported and used by manufacturers was sufficient for only seven-eighths of one grain per capita. For the fiscal year ending June 30, 1921, the per capita consumption of cocaine, according to the sales made by manufacturers, was one-third of one grain, which has been reduced to one-fourth of one grain for the year ending June 30, 1922. The records show a continuing downward trend in the amount of both opium and cocaine consumed so far during the present fiscal year.

Smuggled drugs are not considered in the computation, as there is no method whereby such figures may even be estimated, but the records show that smuggling of narcotics has been materially curtailed, especially during the past year, according to Commissioner Haynes.

The foregoing is a source of great satisfaction. Courts have imposed sentences of imprisonment, lately, that will have a good effect in deterring those who are almost tempted to engage in illegitimate traffic, and check those who have preyed on the unfortunate addicts.

ALCOHOL REGULATIONS.

A new ruling provides that:

Hereafter the vendor will not exhibit all copies of the permit to purchase and the confirmation to the officer in charge at an Internal Revenue bonded warehouse, and such officer will not communicate with the director to ascertain the authenticity of the permit to purchase and the confirmation thereof, as provided in subsection (*d*) of section 57½, regulations 60, as amended by Treasury Decision 3449; and the collector will not, as now provided in subsection (*e*) of the same section, notify the director of the permit to purchase, nor will such permit when it accompanies form 179 bear the notation as to confirmation by the government officer. The collector will in all other respects follow the procedure prescribed by Treasury Decision 3449.

Article 3 of regulations 60 as amended by T. D. 3398 has been modified by T. D. 3480, as follows:

Directors are hereby vested with the same authority as that given the commissioner by article III of regulations 60 as amended by T. D. 3398 to approve or disapprove applications for, and to issue basic permits to physicians to prescribe, to physicians to use intoxicating liquor, to dentists and veterinarians to use alcohol, and permits to transport by truck.

PERMITS TO PURCHASE TEN GALLONS OR LESS OF ALCOHOL NEED NOT BE CONFIRMED.

(T. D. 3483.)

Regulations 60, as amended by T. D. 3449, requiring confirmation of all permits to purchase alcohol and liquors, are hereby further amended so as to exempt from such requirement permits to purchase alcohol in quantities of ten gallons or less.